ANCHOR QEA

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November 21, 2014

Rebecca Chu
U.S. EPA, Remedial Project Manager
1200 Sixth Ave, Suite 900
ECL-111
Seattle, Washington 98101

Re: Jorgensen Forge Early Action Area Removal Action – Pre-final Certification Inspection Letter Report
U.S. EPA Docket No. CERCLA-10-2013-0032

Project Number: 080224-01.02

Dear Ms. Chu:

Anchor QEA, LLC and Farallon Consulting, LLC (Farallon) have prepared this Pre-final Certification Inspection Letter Report (Inspection Report) on behalf of Earle M. Jorgensen Company (EMJ) pursuant to the U.S. Environmental Protection Agency (EPA) Administrative Settlement Agreement and Order on Consent for Removal Action Implementation (AOC; EPA Region 10 Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. 10-2013-0032) and attached Statement of Work (SOW). EMJ completed removal action construction activities described in the EPA-approved *Removal Action Work Plan* (RAWP) on September 13, 2014, associated with the removal of contaminated sediments and associated shoreline bank in a portion of the Lower Duwamish Waterway (LDW) Superfund Site adjacent to the Jorgensen Forge Corporation facility (Facility) located in Tukwila, Washington (Figure 1 in Attachment B; Jorgensen Forge Early Action Area [EAA]). Anchor QEA and Farallon held a Pre-final Certification Inspection Meeting with EPA and U.S. Army Corps of Engineers (USACE)

representatives on November 14, 2014, to document that the removal action was completed in accordance with the EPA-approved documents.

The SOW requires EMJ to submit an Inspection Report to EPA within 7 days of the Pre-final Certification Inspection Meeting (Inspection Meeting). The SOW states that the Inspection Report shall include a summary of the major results under the EPA-approved *Construction Quality Assurance Plan* (CQAP; Appendix D of the Basis of Design Report [BODR]), field changes, and minutes from the Inspection Meeting. In addition, the Inspection Report shall outline any outstanding construction items, actions required to resolve those items, completion date(s) for those items, and a proposed date for final inspection, if necessary. The remainder of this Inspection Report fulfills these SOW requirements.

## INSPECTION MEETING MINUTES, CQAP RESULTS, AND FIELD CHANGES

Anchor QEA and Farallon and reviewed the agenda items provided in Attachment 1 during the Inspection Meeting. The following representatives attended the meeting: Rebecca Chu with EPA: Rob Wilkins and David Clark with USACE, JC Clark with Pacific Pile & Marine (PPM), Amy Essig Desai with Farallon, and Mike Roberts and Ryan Barth with Anchor QEA. The initial portion of the meeting was held at the Facility directly east of the EAA removal action boundary (RAB; Figure 2 in Attachment B). Anchor QEA summarized successful achievement of the following removal action construction elements subject to the CQAP:

- Dredging
- Shoreline Bank Excavation
- Shoreline Containment
- Backfill

For each of these construction elements, inspection and verification activities were implemented in accordance with the BODR and RAWP to confirm that the performance objectives have been achieved. The verification survey results are summarized in Figures 3 through 7b in Attachment B that were submitted to EPA on November 4, 2014 and discussed during the Inspection Meeting. A summary of the Inspection Meeting discussion and achievement of these performance objectives is provided below.

## Pre-construction Baseline Survey

The pre-construction baseline survey was conducted by PPM, the selected contractor, on June 19, 2014, in accordance with the Survey Plan (Appendix K of the RAWP). The survey elevations within the RAB are provided in Figure 3 in Attachment B. As discussed in Section 012000 of the Construction Specifications (Appendix H of the BODR), these elevations were used as the basis of payment for the volumes removed during dredging and shoreline bank excavation.

## Dredging

As detailed in the EPA-approved Final Engineering Evaluation/Cost Analysis (EE/CA), BODR and RAWP, existing sediment chemistry data were used to develop a depth of contamination (DoC) surface that represents the deepest vertical extent of total polychlorinated biphenyl (PCB) Removal Action Level (RvAL) exceedances throughout the RAB. All other elevated chemical of concern (COC) concentrations will be removed via the removal of total PCB RvAL exceedances. Thiessen polygons were generated around each core location within the RAB to identify the DoC surface and Anchor QEA developed a three-dimensional dredge design surface to achieve removal to that surface plus an allowance for dredge accuracy and tolerance. The EPA-approved dredge design surface is depicted in Figure 4 in Attachment B.

EPA required the dredging to be performed in a single dredge event, as verified by bathymetric surveys. To achieve this requirement, Section 4.2.3 of the BODR states "Performing a single dredging event relies on implementation of the design dredge elevation BMP (best management practice), so that each subunit can be dredged to the required elevation, verified with bathymetric surveys, and then as soon as practical within the operational efficiency of the project place of a minimum 3-inch to 6-inch thick lift of clean backfill material over the dredge subunit. Post-dredge surface samples may be collected before or after placement of the clean back fill material, as described in the Construction Quality Assurance Plan (CQAP; Appendix D). This BMP also allows the dredged area to be quickly covered, reducing the potential for ongoing resuspension and release from the loosened residual sediment." To achieve this requirement, verification of the dredging completion was performed in the five dredge management units depicted on Figure 4 in

Attachment B to facilitate continuous tracking of the dredging progress and for post-dredge verification purposes while actively dredging in the vicinity of a Dredge Management Unit (DMU).

Anchor QEA reviewed and approved the final dredging bathymetric elevation surveys within each DMU to confirm that the design elevations were achieved. As soon as practical following Anchor QEA approval of the bathymetry survey in each DMU, PPM placed the EPA-required initial backfill within each DMU. Figures 4, 6a, and 6b in Attachment B document that dredging achieved the in-water removal completion metrics identified in Section 5.1.2 of the CQAP (Appendix D of the BODR).

## Shoreline Bank Excavation

The shoreline bank excavation occurred over a total distance of approximately 570 linear feet, extending from the downriver side of the sheetpile wall to approximately the Facility/Boeing Plant 2 property line (Figure 5 in Attachment B). The shoreline bank excavation extended from the top of the existing bank from approximately +19 feet mean lower low water (MLLW) elevation to the variable elevation toe key depicted on Figure 5 in Attachment B. The design excavation reconfigured the slope to a flatter, more stable 2H:1V slope shoreward of the existing ground surface approximately from the toe of slope upwards to a location that is no closer than five feet to any foundation. To the extent possible based on tidal elevations during construction, the shoreline bank excavation was conducted in-the-dry.

PPM performed shoreline bank excavation in accordance with the *Dredge/Excavation, Haul Barge Transport, and Dewater Plan* (Appendix E of the RAWP) to achieve the EPA-approved target elevations along the bank. Anchor QEA reviewed and approved the shoreline bank excavation surveys prior to placement of shoreline containment. Figures 4, 7a, and 7b in Attachment B document that dredging achieved the in-water removal completion metrics identified in Section 5.1.2 of the CQAP (Appendix D of the BODR).

## Shoreline Containment

The purpose of the shoreline slope containment is to contain the soils and sediments along the shoreline from the LDW and to stabilize the shoreline from future erosion. A 1.5-foot layer of filter material amended with 0.5 percent granular activated carbon (GAC) was placed between the regraded shoreline slope and the placed shoreline armor material to prevent migration of fine soil particles, distribute the weight of the armor units, provide more uniform settlement, and permit relief of hydrostatic pressure within the soils. A design thickness of 2.5 feet of armor material was placed on top of a filter layer to resist erosive forces (e.g., vessel-generated waves and river currents). A design thickness of 6 inches of rounded habitat material was placed on top of the armoring material to help fill the armor material interstitial spaces to promote better habitat quality.

PPM performed shoreline containment placement in accordance with the *Backfill Plan* (Appendix J of the RAWP) to achieve the EPA-approved target elevations along the bank. Anchor QEA reviewed and approved that the filter material and armor material surveys achieved the design elevations. Figures 4, 7a, and 7b in Attachment B document that shoreline containment achieved the placement completion metrics identified in Section 5.2.3 of the CQAP (Appendix D of the BODR). Habitat substrate layer verification was performed through visual observations during placement and spot checks on placement thickness.

## Pre- and Post-Construction Sampling

### *In-water Sediment Z-layer Sampling*

As described in Section 1.3.2 of the Final EE/CA, EPA communicated in a meeting on January 27, 2011 that, although the EPA-approved removal action alternative includes the removal of the full horizontal and vertical extent of total PCB RvAL exceedances in the RAB, and existing data is sufficient to document the sediment quality below these exceedances, EPA will require collection and analysis of the post-dredge surface sediment z-layer samples to fulfill the Washington State Department of Ecology's request for this information.

EPA acknowledged that the removal action activities may result in a thin layer of sediments with residual total PCB concentrations deposited on the final post-dredge surface. Because of this acknowledgement, coupled with the extensive surface and subsurface data collected

within the RAB, EPA approved the Final EE/CA, BODR, and RAWP condition that the results of any post-dredge sampling and analysis would not trigger any further remedial actions unless the area weighted concentrations in the RAB are greater than 20 times the RvAL, or 240 milligrams per kilogram normalized for organic carbon (mg/kg-OC). In the event that post-dredge sampling showed concentrations exceeding 240 mg/kg-OC, further evaluation would be required, and these data would be used to document that the surface backfill concentrations in this area(s) remain protective of human health and the environment based on the surface weighted average concentrations in the RAB.

Anchor QEA field personnel collected a total of seven z-layer surface (0- to 1-foot sample interval below mudline) sediment samples from within the RAB, one of which is located within the containment barrier installed adjacent to the Jorgensen Forge Outfall Site (JFOS). All samples were collected from each DMU as soon as practical, following Anchor QEA approval that the EPA-approved design dredge elevations were achieved in the DMU and prior to placement of clean backfill in the DMU. All sampling was performed in accordance with the CQAP (Appendix D of the BODR).

The sediment z-layer locations and analytical concentrations were submitted to EPA previously on October 30 and provided herein in Attachment C. The total PCB spatially weighted average concentrations (SWAC) for locations PDS-01 through PDS-06 is 64.3 mg/kg-OC. Although this concentration is below the 240 mg/kg-OC trigger for additional evaluation, as approved by EPA in the Final EE/CA and CQAP (Appendix D of the BODR), EPA stated during the Inspection Meeting that, due to the concentrations being greater than the total PCB RvAL (12 mg/kg-OC), it would like to discuss these concentrations further with EMJ. EMJ will schedule a meeting with EPA to further discuss the observed concentrations.

### *Shoreline Bank Z-layer Sampling*

EPA required the collection of post-excavation z-layer shoreline bank samples from the 0- to 1-foot interval to document the nature of the shoreline material beneath the backfill area. In accordance with Comment No. 2 in a letter from EPA to EMJ dated January 22, 2013, "sample results will not compel future remediation events under the existing AOC." Anchor QEA collected a total of six samples at approximately +15 feet MLLW elevation prior to

shoreline bank armor placement. The sediment z-layer locations and analytical concentrations were submitted to EPA previously on October 30 and provided herein in Attachment C.

### *Pre- and post-Construction Perimeter Sampling*

EPA required the collection of pre- and post-construction perimeter surface sediment samples to evaluate whether there are significant increases in concentrations of COCs in surface sediments (0 to 10 centimeters) adjacent to the RAB relative to their pre-remediation concentrations due to releases from the construction activities. To better assess the potential contributions from removal action construction releases versus off-site sources, EMJ also elected to collect samples in an area directly adjacent to the RAB, as well as an upstream area outside the influence of the construction. A total of six discrete samples were collected from each of these areas and submitted for the full list of Washington State Sediment Management Standards (SMS) chemical parameters.

The pre- and post-construction perimeter sampling analytical concentrations are provided in Attachment D. Comparison of the pre- and post-concentrations differences adjacent to the RAB, as well as the upstream area, shows that there were no significant increases in concentrations of COCs adjacent to the RAB due to potential releases from the construction activities.

## Field Changes

In accordance with the CQAP and RAWP procedures, EMJ submitted requests for modification (RFM's) for EPA approval when field changes from the EPA-approved RAWP procedures were necessary to complete the removal action. A complete summary of the submitted RFMs is provided in Attachment E.

## Site/Boat Tour and Site Restoration

During the Inspection Meeting, EPA and USACE representatives toured the top of shoreline bank area of the Facility to review the completed removal action from and post-construction conditions of the removal action work area. Anchor QEA summarized the field changes documented in the RFMs provided in Attachment D. EPA identified no issues with the

observable as-built conditions along the shoreline bank and the Facility upland area within the removal action work area. These representatives also reviewed the observable as-built shoreline bank conditions from a boat, as well as walked the PPM transload facility following demobilization of the facility. EPA identified no issues during the boat and walking tours.

## OUTSTANDING CONSTRUCTION ITEMS

During the Inspection Meeting, EPA confirmed that the submitted performance achievement figures provided in Attachment B document the dredging, shoreline bank excavation, and backfill, and shoreline containment elevations achieve the EPA-approved design elevations presented in the RAWP. Therefore, construction activities are complete. EPA also stated that it would like to discuss further with EMJ the sediment z-layer concentrations. Farallon responded that the EMJ team will schedule a meeting with EPA to discuss this issue.

Sincerely,

Ryan Barth

Ryan Barth, P.E.
Anchor QEA, LLC

Cc:
Mr. E. Gilbert Leon Jr., EMJ (by email only)
Mr. Miles Dyer, Jorgensen Forge Corporation (by email only)
Messrs. William Joyce and Ian Sutton, Joyce Ziker Parkinson, PLLC (by email only)
Messrs. David Templeton and Mike Roberts, Anchor QEA (by email only)

## LIST OF ATTACHMENTS

Attachment A – Pre-final Site Inspection Meeting Agenda
Attachment B – Performance Achievement Documentation
Attachment C – Z-layer Sampling Locations and Analytical Results
Attachment D – Pre- and Post-construction Perimeter Sampling
Attachment E – Request for Modification Communications

# ATTACHMENT A
# PRE-FINAL INSPECTION MEETING AGENDA

**AGENDA**

**EPA PRE-FINAL CERTIFICATION INSPECTION**

**Jorgensen Forge Early Action Area: Removal Action Implementation**

**8531 East Marginal Way South, Seattle, WA 98108-4018**

Jorgensen Forge Office Conference Room: November 14, 2014 10:00 AM

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1. Jorgensen Forge Site Walk
    a. Performance Achievement Documentation
        i. Dredging
        ii. Backfill
        iii. Shoreline Containment
        iv. Site Restoration
    b. CQAP Compliance Documentation
        i. Material Certification
        ii. Survey Documentation
        iii. Z-layer Sampling
        iv. Construction Documentation
    c. Review of Field Changes and Associated Change Orders
        i. Additional Shoreline Bank Debris
        ii. Additional Timber Pilings
        iii. Sheen-generating Material and Shoreline Bank Over-excavation
    d. Site Restoration Activities
2. Boat Tour of Removal Action
3. PPM Yard Site Tour

# ATTACHMENT B
# PERFORMANCE ACHIEVEMENT DOCUMENTATION

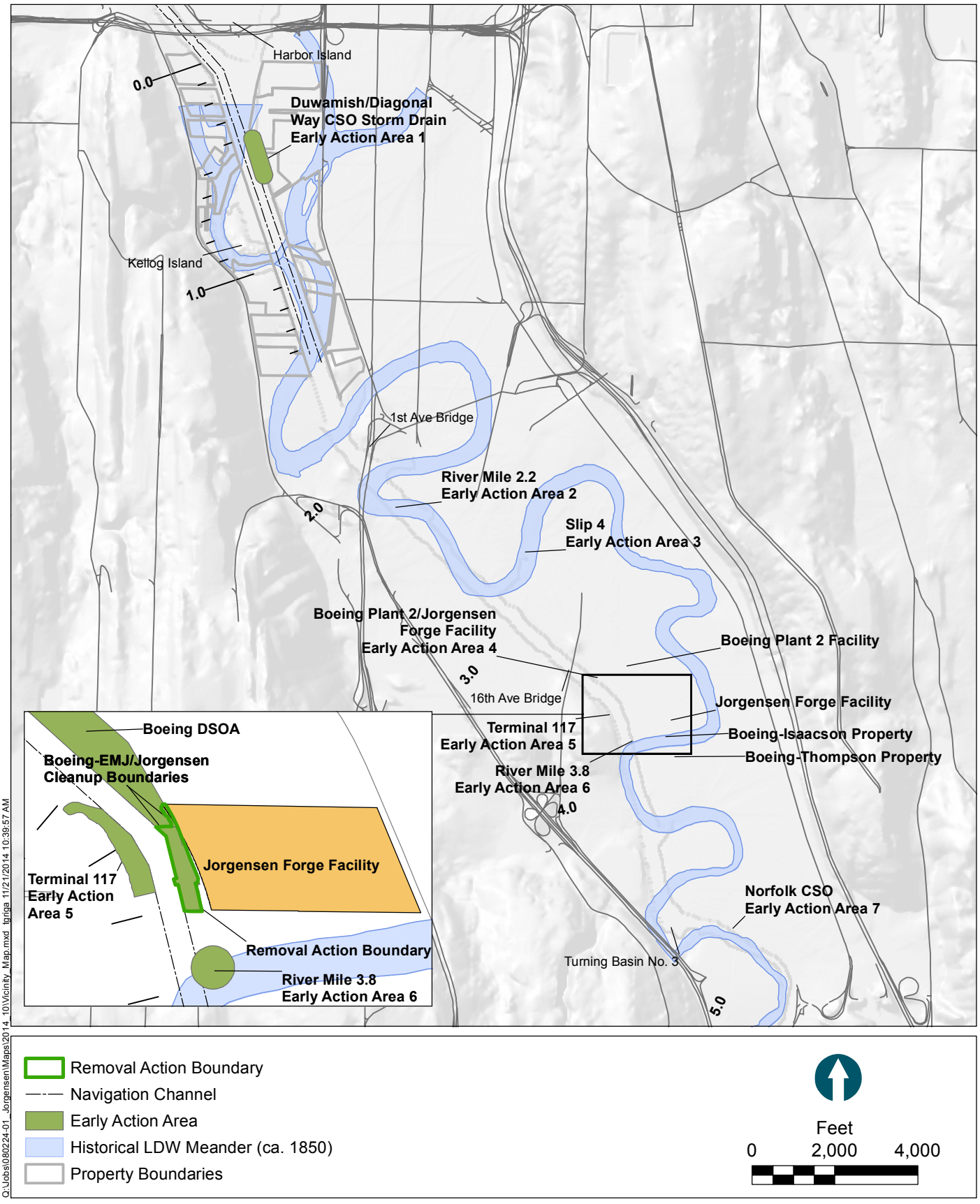
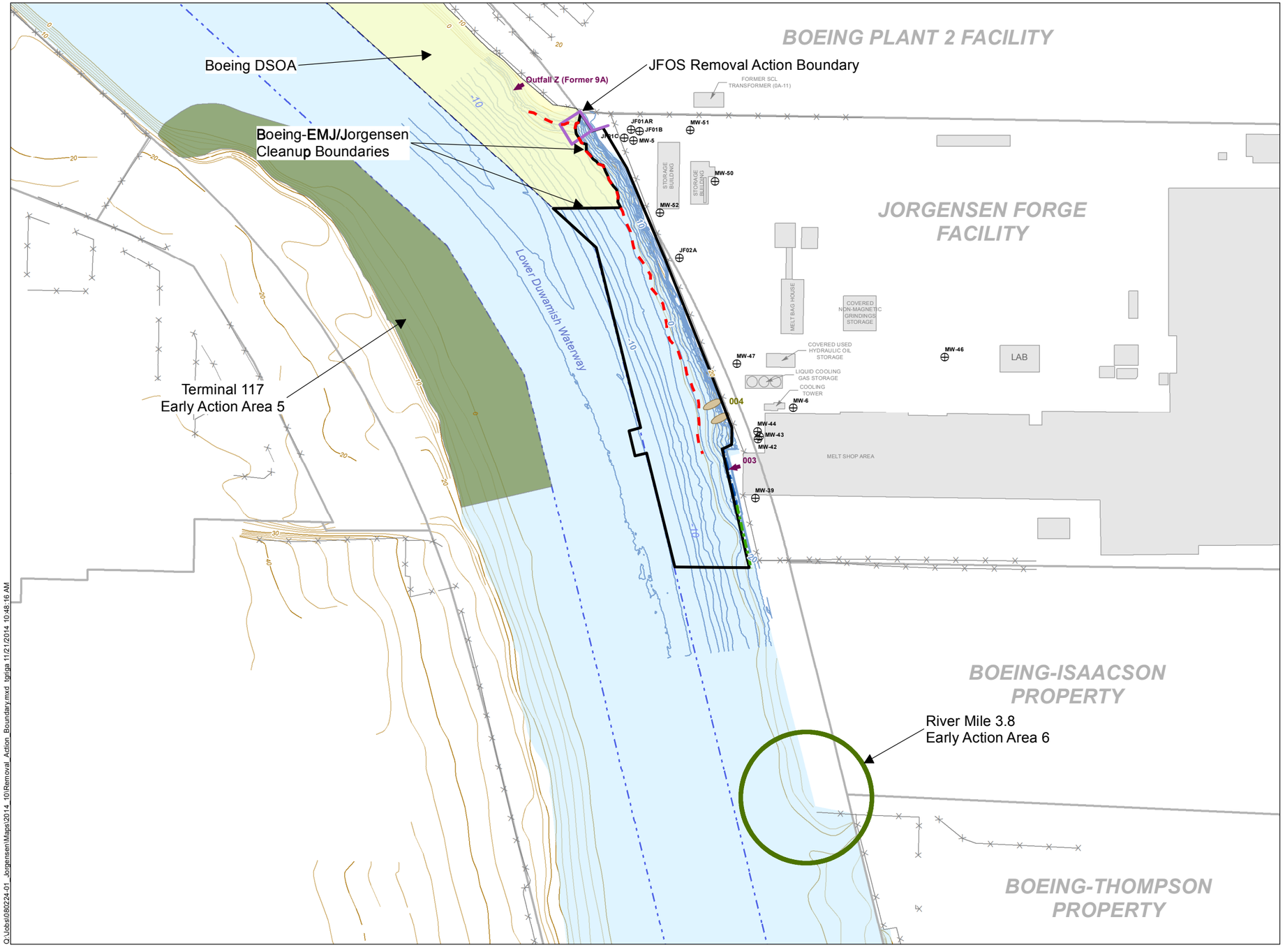



**Figure 1**
Removal Action Vicinity Map
Removal Action Completion Report
Jorgensen Forge Early Action Area




**LEGEND**

- Groundwater Monitoring Well
- Active Outfall
- Toe of Existing Riprap
- Existing Sheetpile Wall
- Existing Concrete Panel Wall
- Fences
- Federal Navigation Channel
- Debris Pile
- Property Boundaries
- Boeing DSOA
- Terminal 117 Early Action Area 5 Boundary
- JFOS Removal Action Boundary
- Removal Action Boundary

NOTES:

1. Bathymetric survey by eTrac dated February 8, 2012. Additional bank survey by AEC Consultants, Inc. dated February 21, 2012. Bathymetric and bank survey merged with upland survey by PLS, Inc. dated January 24, 2012.

2. Outfall locations field identified on May 14, 2003.

3. The toe of riprap slope was surveyed during a low tide on August 28, 2008.

4. The Boeing-EMJ/Jorgensen cleanup boundaries are identified in the Memorandum of Understanding between Boeing and EMJ/Jorgensen Forge, dated August 2007 (EMJ et al. 2007).

5. JFOS = Jorgensen Forge Outfall Site

6. DSOR = Duwamish Sediment Other Area

Feet
0 80 160 240 320

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**Figure 2**
Removal Action Boundary
Removal Action Completion Report
Jorgensen Forge Early Action Area

Shop Building
Concrete Pad
Concrete Pad
Gas Storage Tanks
Melt Shop Warehouse
Jorgensen Forge
Outfall Site
Sheetpile Wall
Concrete Panel Wall
DMU 5
DMU 4
DMU 3
DMU 2
DMU 1
LOWER DUWAMISH WATERWAY
Design Dredge/Excavation Boundary

**LEGEND:**

- Navigation Channel
- Pre-Construction Contours (1 ft interval)
- Jorgensen Forge Outfall Site Containment Barrier Wall
- Removal Action Boundary
- Design Dredge/Excavation Boundary
- Dredge Management Unit (DMU)

0 50
Scale in Feet

**HORIZONTAL DATUM:** Washington State Plane North, NAD83.
**VERTICAL DATUM:** Mean Lower Low Water (MLLW).
**SURVEY:** Pre-construction baseline survey performed by Terrasond dated June 19, 2014.

K:\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\0224-RP-020 RACR.dwg Figure 3
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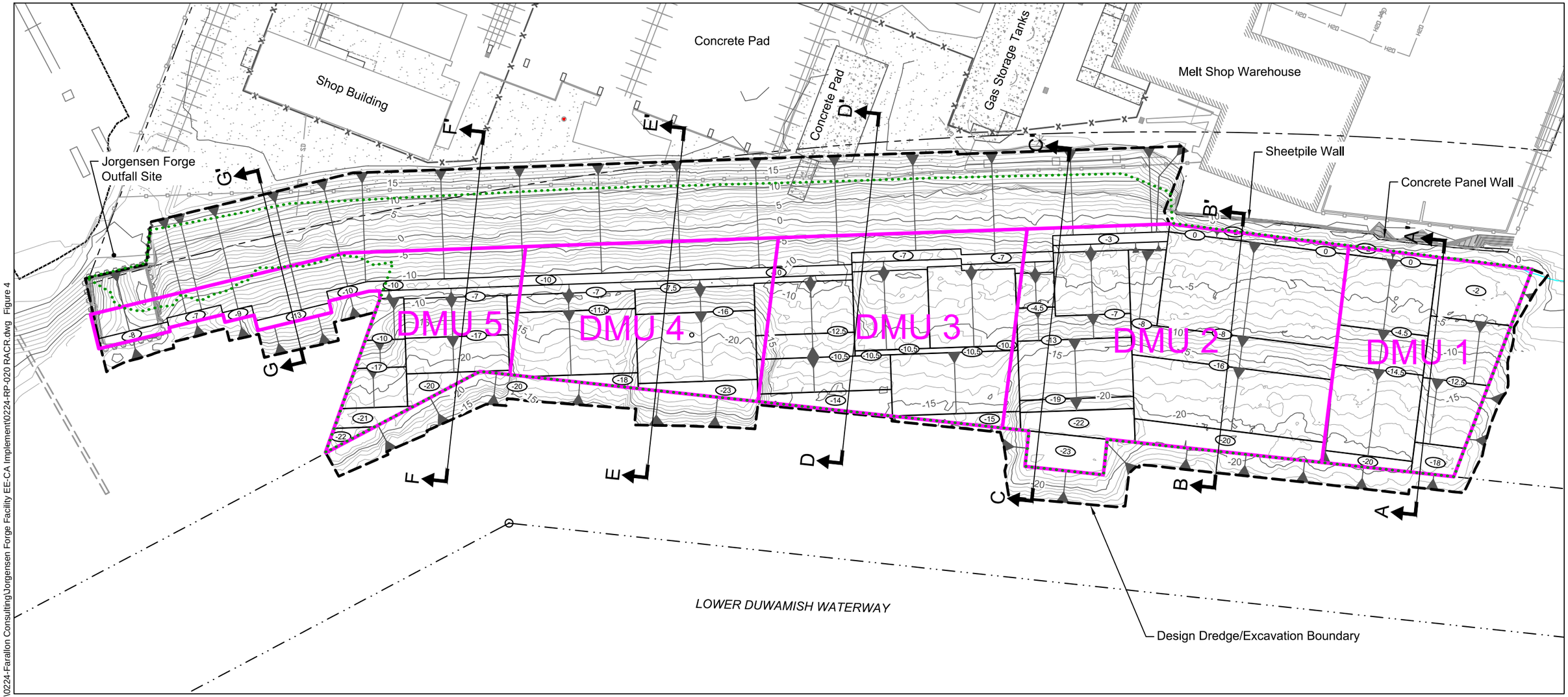
**Figure 3**
Pre-Construction Baseline Survey
Removal Action Completion Report
Jorgensen Forge Early Action Area




**LEGEND:**

- Navigation Channel
- Post-Construction Contours (1 ft interval)
- Jorgensen Forge Outfall Site Containment Barrier Wall
- Removal Action Boundary
- Cross Section Location and Designation
- Required Dredge Elevation (ft MLLW)
- Top of Side Slope
- Final Grade
- Dredge Boundary
- Design Dredge/Excavation Boundary
- Dredge Management Unit (DMU)

0 50
Scale in Feet

**HORIZONTAL DATUM:** Washington State Plane North, NAD83.
**VERTICAL DATUM:** Mean Lower Low Water (MLLW).
**SURVEY:** Post-construction dredge/excavation surveys performed by Terrasond between August 1, 2014 and August 28, 2014.

K:\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\0224-RP-020 RACR.dwg Figure 4
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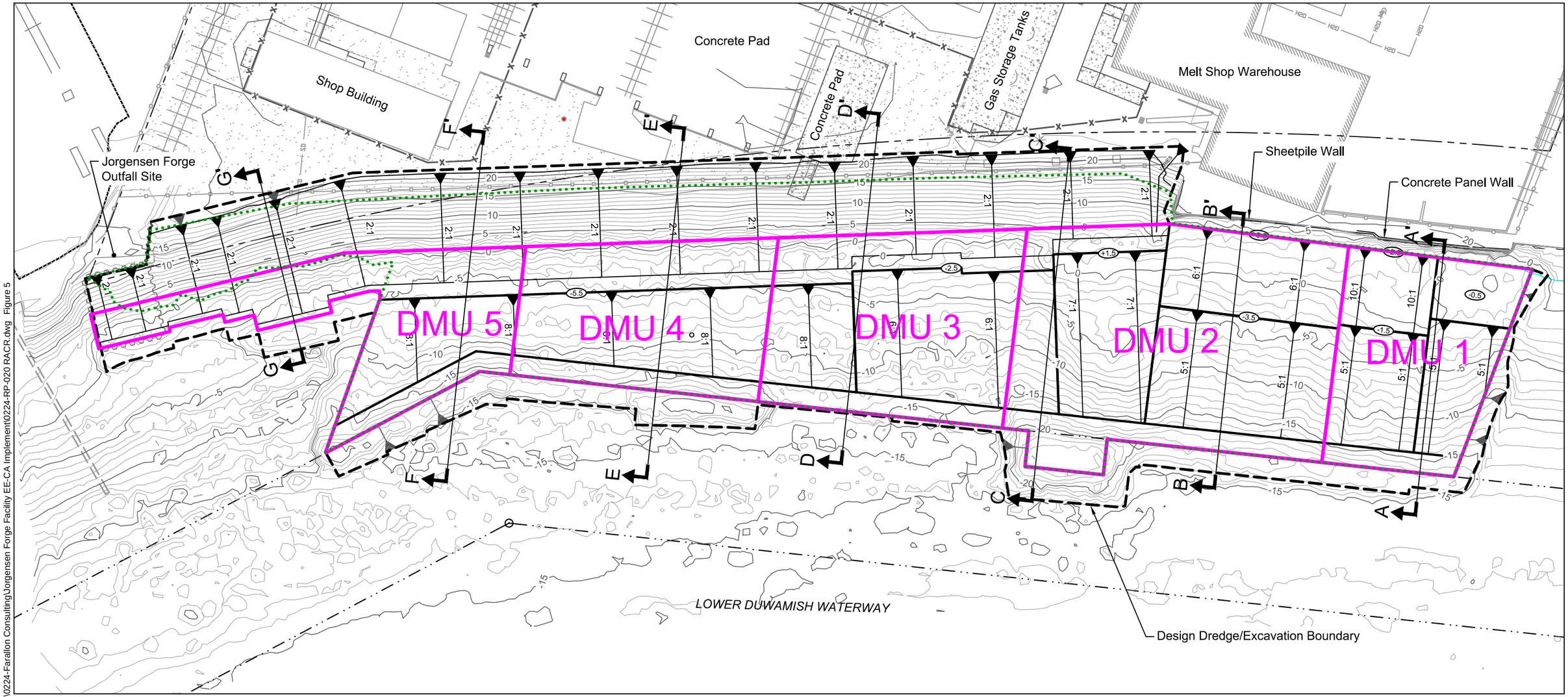
**Figure 4**
Post-Construction Dredge/Excavation Survey
Removal Action Completion Report
Jorgensen Forge Early Action Area




**LEGEND:**

- Navigation Channel
- Post-Construction Contours (1 ft interval)
- Jorgensen Forge Outfall Site Containment Barrier Wall
- Removal Action Boundary
- Cross Section Location and Designation
- Required Backfill/Shoreline Containment Elevation (ft MLLW)
- Top of Side Slope
- Design Slope (Horizontal:Vertical)
- Design Dredge/Excavation Boundary
- Dredge Management Unit (DMU)

0 50
Scale in Feet

**HORIZONTAL DATUM:** Washington State Plane North, NAD83.
**VERTICAL DATUM:** Mean Lower Low Water (MLLW).
**SURVEY:** Final as-built placement survey performed by Terrasond on September 16, 2014.

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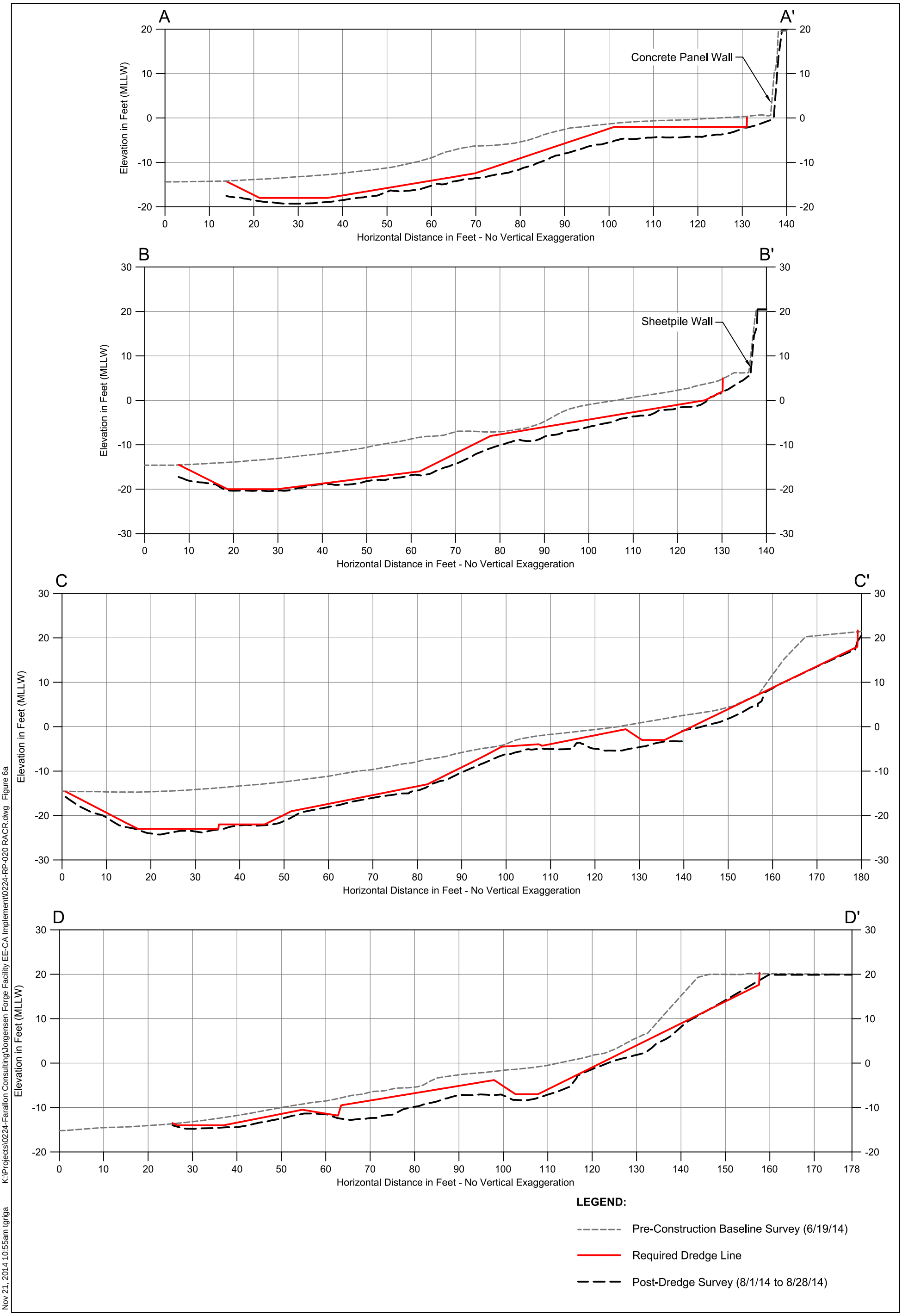
**Figure 5**
Final As-Built Post-Backfill and Shoreline Containment Survey
Removal Action Completion Report
Jorgensen Forge Early Action Area




K:\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implem\0224-RP-020 RACR.dwg Figure 6a
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**Figure 6a**
Comparison of Required Dredge Line and Post-dredge Elevations - Cross Sections
Removal Action Completion Report
Jorgensen Forge Early Action Area

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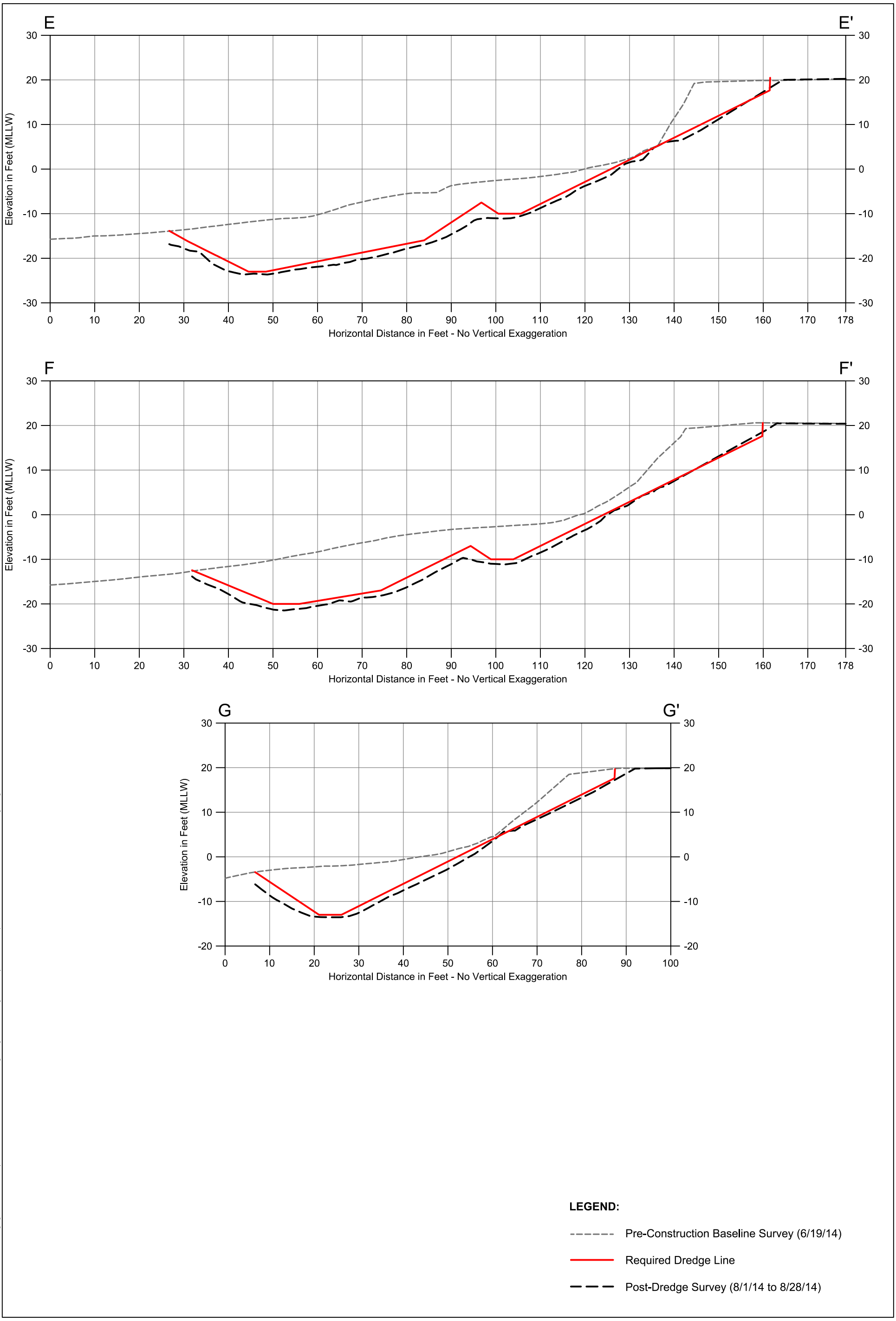


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**Figure 6b**
Comparison of Required Dredge Line and Post-dredge Elevations - Cross Sections
Removal Action Completion Report
Jorgensen Forge Early Action Area

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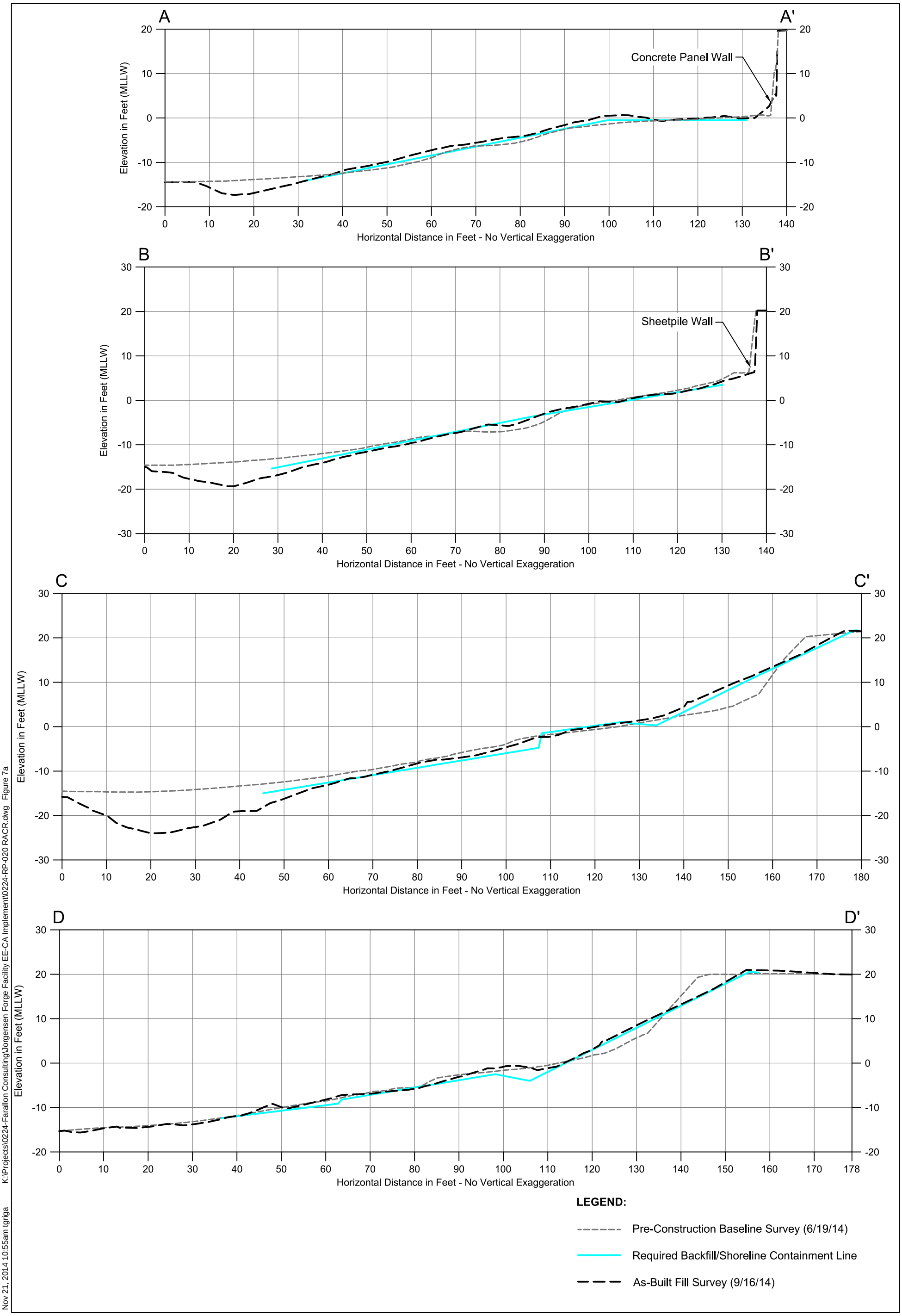


K:\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\0224-RP-020 RACR.dwg Figure 7a
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**Figure 7a**
Comparison of Required Backfill/Shoreline Containment Lines to As-Built Elevations - Cross Sections
Removal Action Completion Report
Jorgensen Forge Early Action Area

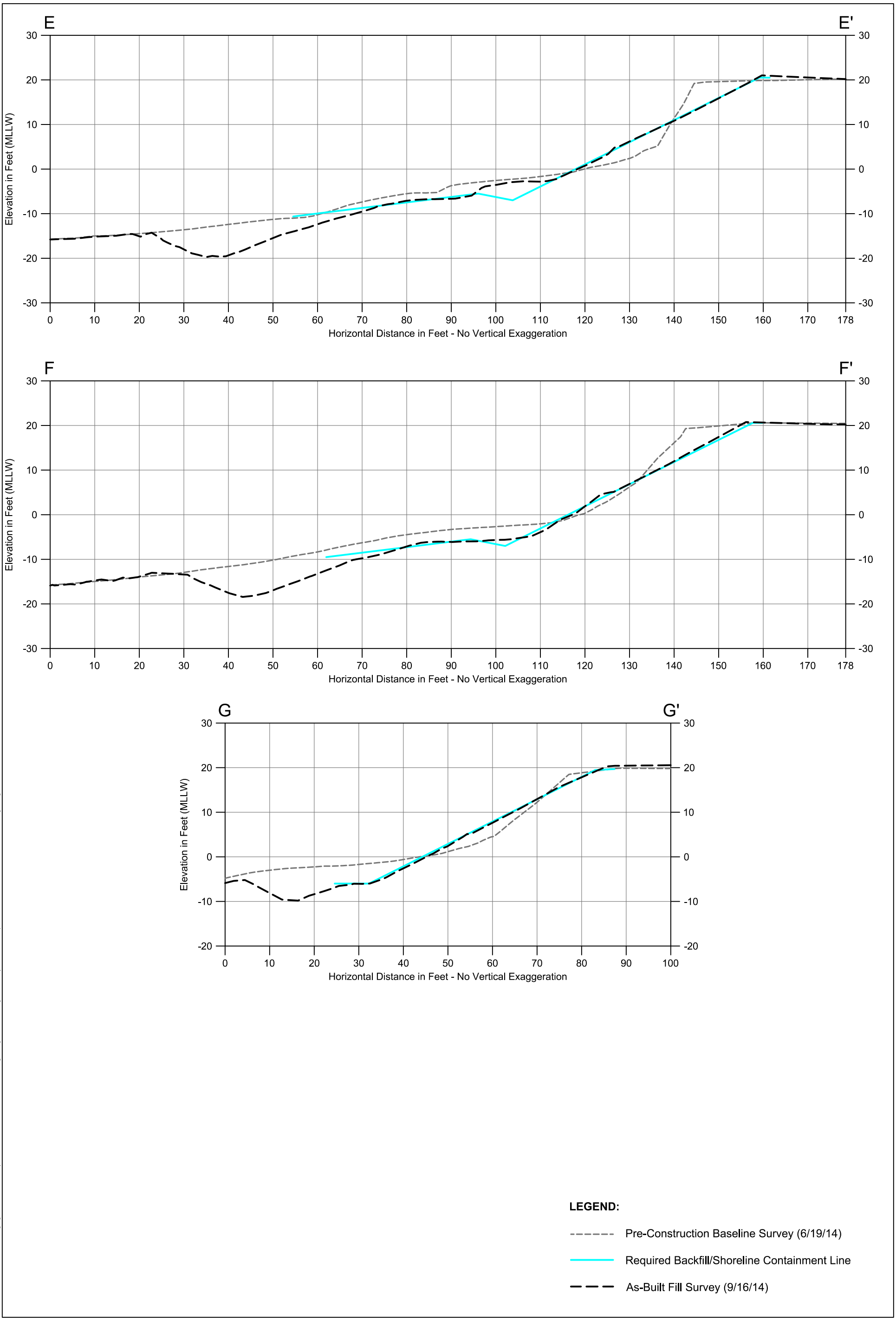




**Figure 7b**
Comparison of Required Backfill/Shoreline Containment Lines to As-Built Elevations - Cross Sections
Removal Action Completion Report
Jorgensen Forge Early Action Area

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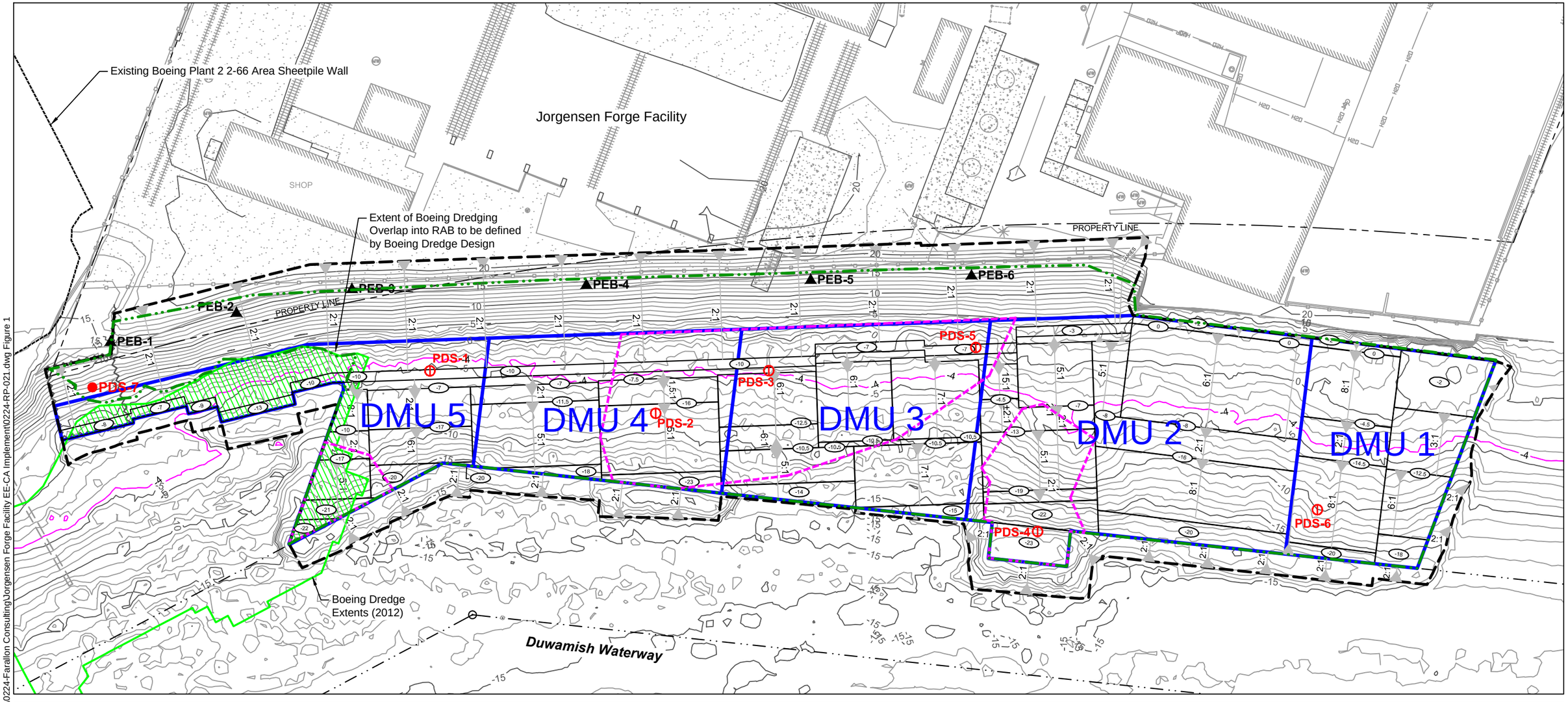
# ATTACHMENT C
# Z-LAYER SAMPLING LOCATIONS AND ANALYTICAL RESULTS

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**HORIZONTAL DATUM:** Washington State Plane North, NAD83.
**VERTICAL DATUM:** Mean Lower Low Water (MLLW).
**NOTES:**

1. Boeing to perform DSOA cleanup to minimize disturbance to completed EMJ Early Action Area (EAA) Removal Action, including dredge residual migration into the EAA Removal Action Boundary. Boeing is responsible for restoring any shoreline containment or backfill materials to the surveyed EAA post-construction elevations if their construction leads to removal or shoreline bank sloughing.
2. The U.S. Army Corps of Engineers is authorized to perform maintenance dredging within the shown limits of the Federal Navigation Channel.
3. Post-construction final as-built survey provided by Pacific Pile & Marine and Terrasond dated September 16, 2014.

**LEGEND:**

- Navigation Channel (See Note 2)
- Post-Construction Contours (1 ft interval)
- Existing Fence Line
- Required Dredge Elevation (ft MLLW)
- Top of Side Slope
- Final Grade
- Dredge Boundary
- Dredge Excavation Boundary
- Removal Action Boundary
- -4 ft MLLW Elevation Contour
- Jorgensen Forge Outfall Site Containment Barrier Wall
- Dredge Management Unit (DMU)
- Relatively Elevated Total PCB Concentration Area
- PDS-1 Sediment Z-Layer Confirmation Sample
- PEB-6 Shoreline Bank Z-Layer Confirmation Sample
- PDS-7 Jorgensen Forge Outfall Site Shoreline Bank Z-Layer Confirmation Sample

0 50
Scale in Feet

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**Figure 1**
Jorgensen Forge EAA Z-Layer Sample Locations
Jorgensen Forge Early Action Area

**Table 1**

**Final Validated Jorgensen Forge Early Action Area Sediment Z-layer Sample Results**

| | | Location ID | PDS-1 | PDS-2 | PDS-3 | PDS-4 | PDS-5 | PDS-6 |
|---|---|---|---|---|---|---|---|---|
| | | Sample ID | JF-PDS-1-140829 | JF-PDS-2-140823 | JF-PDS-3-140816 | JF-PDS-4-140812 | JF-PDS-5-140816 | JF-PDS-6-140805 |
| | | Sample Date | 08/29/2014 | 08/23/2014 | 08/16/2014 | 08/12/2014 | 08/16/2014 | 08/01/2014 |
| | | Depth | 0 - 11.5 in | 0 - 12 in | 0 - 12 in | 0 - 12 in | 0 - 10 in | 0 - 12 in |
| **Conventional Parameters (pct)** | | | | | | | | |
| Total organic carbon | Plumb 1981 | | **0.93** | **0.694** | **0.659 J** | **1.64 J** | **2.4 J** | **0.841 J** |
| Total solids | SM2540G | | **63.4** | **70.94** | **68.4** | **58.59** | **56.96** | **65.35** |
| **Grain Size (pct)** | | | | | | | | |
| Gravel | PSEP | | **1** | **0.7** | **4.1** | **0.4** | **0.3** | **1.5** |
| Sand, very coarse | PSEP | | **1.3** | **0.6** | **1.3** | **1.1** | **0.7** | **5.3** |
| Sand, coarse | PSEP | | **5.5** | **4.5** | **3.2** | **5.5** | **3.2** | **20.1** |
| Sand, medium | PSEP | | **24.3** | **26.9** | **8.5** | **13.1** | **9.2** | **26.6** |
| Sand, fine | PSEP | | **22.1** | **40** | **38.5** | **15.6** | **8.3** | **8** |
| Sand, very fine | PSEP | | **14** | **13.2** | **28.5** | **17.5** | **12.6** | **9.5** |
| Silt, coarse | PSEP | | **9.1** | **4.8** | **5.5** | **8.4** | **14.3** | **7.2** |
| Silt, medium | PSEP | | **8.4** | **3.4** | **4.3** | **13.4** | **18.1** | **8** |
| Silt, fine | PSEP | | **6** | **2.2** | **2.3** | **10.6** | **18.1** | **6** |
| Silt, very fine | PSEP | | **3.3** | **1.1** | **1** | **5.4** | **5.8** | **2.5** |
| Clay, coarse | PSEP | | **1.7** | **0.7** | **0.8** | **2.5** | **3.2** | **1.6** |
| Clay, medium | PSEP | | **1** | **0.4** | **0.6** | **2.2** | **2.1** | **1.1** |
| Clay, fine | PSEP | | **2.4** | **1.4** | **1.6** | **4.5** | **4** | **2.7** |
| **Metals (mg/kg)** | | | | | | | | |
| Arsenic | SW6020A | | **7.2** | **4** | **5.9** | **8.3** | **17.6** | **6.1** |
| Cadmium | SW6020A | | **0.5** | **0.133 J** | **0.4** | **0.4** | **0.6** | **0.2** |
| Chromium | SW6020A | | **38.4** | **14.2** | **28.3** | **27** | **42** | **25** |
| Copper | SW6020A | | **35.2** | **14.7 J** | **27.3** | **37.2** | **52** | **30** |
| Lead | SW6020A | | **69.2** | **27.6 J** | **126 J** | **33** | **182** | **22.9** |
| Mercury | SW7471A | | **0.07** | **0.0261 J** | **0.04** | **0.11** | **0.15** | **0.07** |
| Silver | SW6020A | | **0.284 J** | **0.08 J** | 0.3 U | **0.4** | **0.4** | **0.3** |
| Zinc | SW6020A | | **330** | **45** | **104** | **95** | **134** | **66** |
| **PCB Aroclors (µg/kg)** | | | | | | | | |
| Aroclor 1016 | SW8082A | | 47 U | 9.3 U | 9.5 U | 10 U | 9.6 U | 8.9 U |
| Aroclor 1221 | SW8082A | | 47 U | 9.3 U | 9.5 U | 10 U | 9.6 U | 8.9 U |

**Table 1**

**Final Validated Jorgensen Forge Early Action Area Sediment Z-layer Sample Results**

| | | Location ID | PDS-1 | PDS-2 | PDS-3 | PDS-4 | PDS-5 | PDS-6 |
|---|---|---|---|---|---|---|---|---|
| | | Sample ID | JF-PDS-1-140829 | JF-PDS-2-140823 | JF-PDS-3-140816 | JF-PDS-4-140812 | JF-PDS-5-140816 | JF-PDS-6-140805 |
| | | Sample Date | 08/29/2014 | 08/23/2014 | 08/16/2014 | 08/12/2014 | 08/16/2014 | 08/01/2014 |
| | | Depth | 0 - 11.5 in | 0 - 12 in | 0 - 12 in | 0 - 12 in | 0 - 10 in | 0 - 12 in |
| Aroclor 1232 | SW8082A | | 47 U | 9.3 U | 9.5 U | 10 U | 9.6 U | 8.9 U |
| Aroclor 1242 | SW8082A | | 47 U | 9.3 U | 9.5 U | 10 U | 9.6 U | 8.9 U |
| Aroclor 1248 | SW8082A | | 470 U | 93 U | 280 U | **360** | 240 U | **56** |
| Aroclor 1254 | SW8082A | | **1100** | **200** | **740** | **300** | **760** | **100 J** |
| Aroclor 1260 | SW8082A | | **460** | **52** | **220** | **100** | **180** | **42** |
| Total PCB Aroclors (U = 0) | | | **1560** | **252** | **960** | **760** | **940** | **198 J** |
| **PCB Aroclors (mg/kg-OC)** | | | | | | | | |
| Total PCB Aroclors (U = 0) | | | **167.742** | **36.3112** | **145.6753** | **46.341** | **39.1667** | **23.5434 J** |

Notes:

**Bold = Detected result**

µg/kg = micrograms per kilogram

cm = centimeter

J = Estimated value

mg/kg = milligrams per kilogram

OC = organic carbon

PCB = polychlorinated biphenyl

pct = percent

R = Rejected

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

**Table 2**

**Final Validated Jorgensen Forge Early Action Area Shoreline Bank Z-layer Sample Results**

| | Location ID | PEB-1 | PEB-2 | PEB-3 | PEB-4 | PEB-5 | PEB-6 |
|---|---|---|---|---|---|---|---|
| | Sample ID | JF-PEB-1-140825 | JF-PEB-2-140825 | JF-PEB-3-140825 | JF-PEB-4-140825 | JF-PEB-5-140825 | JF-PEB-6-140825 |
| | Sample Date | 08/25/2014 | 08/25/2014 | 08/25/2014 | 08/25/2014 | 08/25/2014 | 08/25/2014 |
| | Depth | 0 - 12 in | 0 - 12 in | 0 - 12 in | 0 - 12 in | 0 - 12 in | 0 - 12 in |
| **Conventional Parameters (mg/kg)** | | | | | | | |
| Ammonia as nitrogen | E350.1M | 0.1 U | **0.69** | 1.08 U | 0.09 U | 0.1 U | 1.15 U |
| Sulfide | SM4500S2D | 1.13 U | 1.07 U | **4.08** | **18.9** | **23.6** | **23.2** |
| **Conventional Parameters (pct)** | | | | | | | |
| Total organic carbon | Plumb 1981 | **1.3** | **0.689** | **0.591** | **0.368** | **0.099** | **0.646** |
| Total solids | SM2540G | **95.22** | **93.14** | **83.06** | **104** | **95.65** | **84.33** |
| Total solids (preserved) | SM2540G | **86.81** | **91.27** | **76.83** | **84.75** | **91.38** | **77.26** |
| **Grain Size (pct)** | | | | | | | |
| Gravel | PSEP | **52.9** | **28** | **48.9** | **56.3** | **61.7** | **74.2** |
| Sand, very coarse | PSEP | **8.8** | **3.8** | **9.6** | **10.6** | **10.9** | **5.8** |
| Sand, coarse | PSEP | **9.2** | **13.5** | **7.4** | **8.6** | **12.2** | **4.6** |
| Sand, medium | PSEP | **9.7** | **26.8** | **6.5** | **8** | **10.4** | **3.7** |
| Sand, fine | PSEP | **6.1** | **14** | **5.6** | **6.3** | **2.9** | **2.9** |
| Sand, very fine | PSEP | **3.8** | **5.2** | **5.9** | **4.4** | **1** | **2.3** |
| Silt, coarse | PSEP | **2.4** | **2.4** | **3.4** | **0.7** | 0.8 U | **2** |
| Silt, medium | PSEP | **1.8** | **1.8** | **11.9** | **1.9** | 0.8 U | **1.7** |
| Silt, fine | PSEP | **1.7** | **1.3** | **0.1** | **1.4** | 0.8 U | **1.4** |
| Silt, very fine | PSEP | **1.2** | **1.1** | **0.2** | **0.9** | 0.8 U | **0.8** |
| Clay, coarse | PSEP | **0.9** | **0.7** | **0.1** | **0.5** | 0.8 U | **0.4** |
| Clay, medium | PSEP | **0.6** | **0.6** | **0.1** | **0.3** | 0.8 U | **0.2** |
| Clay, fine | PSEP | **1** | **0.8** | **0.3** | **0.3** | 0.8 U | **0.2** |
| **Metals (mg/kg)** | | | | | | | |
| Arsenic | SW6020A | **9.9** | **3.8** | **5.8** | **12.9** | **4.1** | **8** |
| Cadmium | SW6020A | **1.1 J** | **0.5 J** | **0.4 J** | **0.5 J** | **0.1 J** | **0.4 J** |
| Chromium | SW6020A | **30** | **23.3** | **629** | **481** | **54.2** | **1130** |
| Copper | SW6020A | **96.1 J** | **27.7 J** | **90.7 J** | **95.5 J** | **24.3 J** | **61.2 J** |
| Lead | SW6020A | **153 J** | **26.9 J** | **107 J** | **806 J** | **68.1 J** | **6600 J** |
| Mercury | SW7471A | **0.04** | **0.03** | **0.005 J** | **0.0138 J** | **0.0091 J** | **0.0222 J** |
| Silver | SW6020A | **0.2** | **0.116 J** | **0.234 J** | **0.192 J** | **0.068 J** | **0.221 J** |
| Zinc | SW6020A | **3880** | **184** | **281** | **210** | **56** | **197** |
| **Semivolatile Organics (µg/kg)** | | | | | | | |
| 1,2,4-Trichlorobenzene | SW8270D | 57 U | 58 U | 19 U | 19 U | 19 U | 20 U |
| 1,2,4-Trichlorobenzene | SW8270DSIM | 14 U | 15 U | 4.7 U | 4.8 U | 4.7 U | 4.9 U |
| 1,2-Dichlorobenzene | SW8270D | 57 U | 58 U | 19 U | 19 U | 19 U | 20 U |
| 1,2-Dichlorobenzene | SW8270DSIM | 14 U | 15 U | 4.7 U | 4.8 U | 4.7 U | 4.9 U |
| 1,4-Dichlorobenzene | SW8270D | 57 U | 58 U | 19 U | 19 U | 19 U | 20 U |
| 1,4-Dichlorobenzene | SW8270DSIM | 14 U | 15 U | 4.7 U | 4.8 U | 4.7 U | 4.9 U |

**Table 2**

**Final Validated Jorgensen Forge Early Action Area Shoreline Bank Z-layer Sample Results**

| | | Location ID | PEB-1 | PEB-2 | PEB-3 | PEB-4 | PEB-5 | PEB-6 |
|---|---|---|---|---|---|---|---|---|
| | | Sample ID | JF-PEB-1-140825 | JF-PEB-2-140825 | JF-PEB-3-140825 | JF-PEB-4-140825 | JF-PEB-5-140825 | JF-PEB-6-140825 |
| | | Sample Date | 08/25/2014 | 08/25/2014 | 08/25/2014 | 08/25/2014 | 08/25/2014 | 08/25/2014 |
| | | Depth | 0 - 12 in | 0 - 12 in | 0 - 12 in | 0 - 12 in | 0 - 12 in | 0 - 12 in |
| 2,4-Dimethylphenol | SW8270D | | 290 U | 290 U | **-- R** | 96 UJ | 95 UJ | **-- R** |
| 2,4-Dimethylphenol | SW8270DSIM | | 72 U | 73 U | **-- R** | 24 UJ | 24 UJ | **-- R** |
| 2-Methylphenol (o-Cresol) | SW8270D | | 57 U | 58 U | **-- R** | 19 UJ | 19 U | **-- R** |
| 2-Methylphenol (o-Cresol) | SW8270DSIM | | 14 U | 15 U | **-- R** | 4.8 UJ | 4.7 U | **-- R** |
| 4-Methylphenol (p-Cresol) | SW8270D | | 57 U | 58 U | **36 J** | 19 UJ | 19 U | **-- R** |
| 4-Methylphenol (p-Cresol) | SW8270DSIM | | 14 U | 15 U | **40 J** | **6.2 J** | 4.7 U | **14 J** |
| Benzoic acid | SW8270D | | **180 J** | 580 U | **-- R** | 190 UJ | **-- R** | **-- R** |
| Benzyl alcohol | SW8270D | | 57 U | 58 U | 19 U | 19 U | 19 U | 20 U |
| Benzyl alcohol | SW8270DSIM | | 57 U | 58 U | 19 U | 19 U | 19 U | 20 U |
| bis(2-Ethylhexyl)phthalate | SW8270D | | 140 U | 150 U | 47 U | 48 U | 47 U | 49 U |
| Butylbenzyl phthalate | SW8270D | | 57 U | 58 U | 19 U | 19 U | 19 U | 20 U |
| Butylbenzyl phthalate | SW8270DSIM | | 14 U | 15 U | 4.7 U | **4.6 J** | 4.7 U | 4.9 U |
| Dibenzofuran | SW8270D | | 57 U | 58 U | **11 J** | **31** | 19 U | **11 J** |
| Diethyl phthalate | SW8270D | | 57 U | 58 U | 23 U | 29 U | 19 U | 20 U |
| Diethyl phthalate | SW8270DSIM | | 57 U | 58 U | 23 UJ | 28 UJ | 19 U | 20 U |
| Dimethyl phthalate | SW8270D | | 57 U | 58 U | 19 U | 19 U | 19 U | 20 U |
| Dimethyl phthalate | SW8270DSIM | | 14 U | 15 U | 4.7 U | 4.8 U | 4.7 U | 4.9 U |
| Di-n-butyl phthalate | SW8270D | | **60** | 58 U | 19 U | **9.6 J** | 19 U | **12 J** |
| Di-n-octyl phthalate | SW8270D | | 57 U | 58 U | 19 U | 19 U | 19 U | 20 U |
| Hexachlorobenzene | SW8270D | | 57 U | 58 U | 19 U | 19 U | 19 U | 20 U |
| Hexachlorobenzene | SW8270DSIM | | 14 U | 15 U | 4.7 U | 4.8 U | 4.7 U | 4.9 U |
| Hexachlorobutadiene (Hexachloro-1,3-butadiene) | SW8270D | | 57 U | 58 U | 19 U | 19 U | 19 U | 20 U |
| Hexachlorobutadiene (Hexachloro-1,3-butadiene) | SW8270DSIM | | 14 U | 15 U | 4.7 U | 4.8 U | 4.7 U | 4.9 U |
| n-Nitrosodiphenylamine | SW8270D | | 57 U | 58 U | 19 U | 19 U | 19 U | 20 U |
| n-Nitrosodiphenylamine | SW8270DSIM | | **10 J** | **11 J** | **4.6 J** | **10** | 4.7 U | **14** |
| Pentachlorophenol | SW8270D | | 290 U | 290 U | **-- R** | 96 UJ | 95 UJ | **-- R** |
| Pentachlorophenol | SW8270DSIM | | **38 J** | 58 U | **-- R** | 19 UJ | 19 UJ | **-- R** |
| Phenol | SW8270D | | 57 U | 58 U | **-- R** | 19 UJ | 19 U | **8.8 J** |
| Phenol | SW8270DSIM | | 14 U | 15 U | **-- R** | **7.3 J** | 4.7 U | **9.5 J** |
| **Polycyclic Aromatic Hydrocarbons (µg/kg)** | | | | | | | | |
| 2-Methylnaphthalene | SW8270D | | **20 J** | 58 U | **9.4 J** | **51** | 19 U | **30** |
| Acenaphthene | SW8270D | | 57 U | 58 U | 19 U | **28** | 19 U | 20 U |
| Acenaphthylene | SW8270D | | **140** | 58 U | 19 U | **15 J** | 19 U | 20 U |
| Anthracene | SW8270D | | **110** | 58 U | **18 J** | **58** | 19 U | **13 J** |
| Benzo(a)anthracene | SW8270D | | **730** | 58 U | **14 J** | **190** | 19 U | **31** |
| Benzo(a)pyrene | SW8270D | | **520** | 58 U | 19 U | **190** | 19 U | **52** |

**Table 2**

**Final Validated Jorgensen Forge Early Action Area Shoreline Bank Z-layer Sample Results**

| | | Location ID | PEB-1 | PEB-2 | PEB-3 | PEB-4 | PEB-5 | PEB-6 |
|---|---|---|---|---|---|---|---|---|
| | | Sample ID | JF-PEB-1-140825 | JF-PEB-2-140825 | JF-PEB-3-140825 | JF-PEB-4-140825 | JF-PEB-5-140825 | JF-PEB-6-140825 |
| | | Sample Date | 08/25/2014 | 08/25/2014 | 08/25/2014 | 08/25/2014 | 08/25/2014 | 08/25/2014 |
| | | Depth | 0 - 12 in | 0 - 12 in | 0 - 12 in | 0 - 12 in | 0 - 12 in | 0 - 12 in |
| Benzo(b,j,k)fluoranthenes | SW8270D | | **1300** | 120 U | **18 J** | **370** | 38 U | **100** |
| Benzo(g,h,i)perylene | SW8270D | | **210** | 58 U | 19 U | **110** | 19 U | **59** |
| Chrysene | SW8270D | | **800** | 58 U | **31** | **290** | 19 U | **66** |
| Dibenzo(a,h)anthracene | SW8270D | | **77** | 58 U | 19 U | **34** | 19 U | **16 J** |
| Fluoranthene | SW8270D | | **930** | 58 U | **48** | **450** | **11 J** | **74** |
| Fluorene | SW8270D | | 57 U | 58 U | 19 U | **26** | 19 U | 20 U |
| Indeno(1,2,3-c,d)pyrene | SW8270D | | **210** | 58 U | 19 U | **110** | 19 U | **55** |
| Naphthalene | SW8270D | | 57 U | 58 U | **13 J** | **60** | 19 U | **28** |
| Phenanthrene | SW8270D | | **150** | **41 J** | **92** | **360** | **11 J** | **81** |
| Pyrene | SW8270D | | **900** | 58 U | **31** | **400** | **10 J** | **76** |
| Total HPAH (SMS) (U = 0) | | | **5677** | 120 U | **142 J** | **2144** | **21 J** | **529 J** |
| Total LPAH (SMS) (U = 0) | | | **400** | **41 J** | **123 J** | **547 J** | **11 J** | **122 J** |
| **PCB Aroclors (µg/kg)** | | | | | | | | |
| Aroclor 1016 | SW8082A | | 44 U | 8.9 U | 8.8 U | 96 U | 8.6 U | 49 U |
| Aroclor 1221 | SW8082A | | 44 U | 8.9 U | 8.8 U | 96 U | 8.6 U | 49 U |
| Aroclor 1232 | SW8082A | | 44 U | 8.9 U | 8.8 U | 96 U | 8.6 U | 49 U |
| Aroclor 1242 | SW8082A | | 44 U | 8.9 U | 8.8 U | 96 U | 8.6 U | 49 U |
| Aroclor 1248 | SW8082A | | 44 U | 8.9 U | 8.8 U | 1900 U | 8.6 U | 49 U |
| Aroclor 1254 | SW8082A | | **470** | **160** | 8.8 U | **11000** | **200** | **1300** |
| Aroclor 1260 | SW8082A | | **190** | **31** | 8.8 U | 1200 U | **56** | **300 J** |
| Total PCB Aroclors (U = 0) | | | **660** | **191** | 8.8 U | **11000** | **256** | **1600 J** |

Notes:

**Bold = Detected result**

µg/kg = micrograms per kilogram

cm = centimeter

J = Estimated value

mg/kg = milligrams per kilogram

OC = organic carbon

PCB = polychlorinated biphenyl

pct = percent

R = Rejected

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

**Table 3**

**Final Validated Jorgensen Forge Outfall Site Shoreline Bank Z-layer Results**

| | | Location ID | PDS-7 |
|---|---|---|---|
| | | Sample ID | JF-PDS-7-140719 |
| | | Sample Date | 07/19/2014 |
| | | Depth | 0 - 12 in |
| **Conventional Parameters (mg/kg)** | | | |
| Ammonia as nitrogen | E350.1M | | **0.24** |
| Sulfide | SM4500S2D | | **172 J** |
| **Conventional Parameters (pct)** | | | |
| Total organic carbon | Plumb 1981 | | **0.231 J** |
| Total solids | SM2540G | | **79.89** |
| Total solids (preserved) | SM2540G | | **79.94** |
| **Grain Size (pct)** | | | |
| Gravel | PSEP | | **2.9** |
| Sand, very coarse | PSEP | | **4.5** |
| Sand, coarse | PSEP | | **15.8** |
| Sand, medium | PSEP | | **38.3** |
| Sand, fine | PSEP | | **27.2** |
| Sand, very fine | PSEP | | **5** |
| Silt, coarse | PSEP | | **2.7** |
| Silt, medium | PSEP | | **1.4** |
| Silt, fine | PSEP | | **0.7** |
| Silt, very fine | PSEP | | **0.5** |
| Clay, coarse | PSEP | | **0.3** |
| Clay, medium | PSEP | | **0.2** |
| Clay, fine | PSEP | | **0.5** |
| **Metals (mg/kg)** | | | |
| Arsenic | SW6020A | | **2.7** |
| Cadmium | SW6020A | | **1.4** |
| Chromium | SW6020A | | **22.7** |
| Copper | SW6020A | | **49.4 J** |
| Lead | SW6020A | | **35.9 J** |
| Mercury | SW7471A | | **0.06** |
| Silver | SW6020A | | **0.4** |
| Zinc | SW6020A | | **212 J** |
| **Semivolatile Organics (µg/kg)** | | | |
| 1,2,4-Trichlorobenzene | SW8270D | | **32** |
| 1,2,4-Trichlorobenzene | SW8270DSIM | | **31** |
| 1,2-Dichlorobenzene | SW8270D | | **8.4 J** |
| 1,2-Dichlorobenzene | SW8270DSIM | | **9.6** |
| 1,4-Dichlorobenzene | SW8270D | | **41** |
| 1,4-Dichlorobenzene | SW8270DSIM | | **41** |
| 2,4-Dimethylphenol | SW8270D | | 94 UJ |
| 2,4-Dimethylphenol | SW8270DSIM | | 24 UJ |
| 2-Methylphenol (o-Cresol) | SW8270D | | 19 UJ |
| 2-Methylphenol (o-Cresol) | SW8270DSIM | | 4.7 UJ |
| 4-Methylphenol (p-Cresol) | SW8270D | | 19 UJ |
| 4-Methylphenol (p-Cresol) | SW8270DSIM | | **6.8 J** |

**Table 3**

**Final Validated Jorgensen Forge Outfall Site Shoreline Bank Z-layer Results**

| | | Location ID | PDS-7 |
|---|---|---|---|
| | | Sample ID | JF-PDS-7-140719 |
| | | Sample Date | 07/19/2014 |
| | | Depth | 0 - 12 in |
| Benzoic acid | SW8270D | | **150 J** |
| Benzyl alcohol | SW8270D | | 19 U |
| Benzyl alcohol | SW8270DSIM | | 19 U |
| bis(2-Ethylhexyl)phthalate | SW8270D | | **110** |
| Butylbenzyl phthalate | SW8270D | | 19 U |
| Butylbenzyl phthalate | SW8270DSIM | | 4.7 U |
| Dibenzofuran | SW8270D | | 19 U |
| Diethyl phthalate | SW8270D | | **18 J** |
| Diethyl phthalate | SW8270DSIM | | 19 U |
| Dimethyl phthalate | SW8270D | | 19 U |
| Dimethyl phthalate | SW8270DSIM | | 4.7 U |
| Di-n-butyl phthalate | SW8270D | | **27** |
| Di-n-octyl phthalate | SW8270D | | 19 U |
| Hexachlorobenzene | SW8270D | | 19 U |
| Hexachlorobenzene | SW8270DSIM | | 4.7 U |
| Hexachlorobutadiene (Hexachloro-1,3-butadiene) | SW8270D | | 19 U |
| Hexachlorobutadiene (Hexachloro-1,3-butadiene) | SW8270DSIM | | 4.7 U |
| n-Nitrosodiphenylamine | SW8270D | | **-- R** |
| n-Nitrosodiphenylamine | SW8270DSIM | | **-- R** |
| Pentachlorophenol | SW8270D | | 94 UJ |
| Pentachlorophenol | SW8270DSIM | | **10 J** |
| Phenol | SW8270D | | **14 J** |
| Phenol | SW8270DSIM | | 14 U |
| **Polycyclic Aromatic Hydrocarbons (µg/kg)** | | | |
| 2-Methylnaphthalene | SW8270D | | **12 J** |
| Acenaphthene | SW8270D | | **11 J** |
| Acenaphthylene | SW8270D | | 19 UJ |
| Anthracene | SW8270D | | 19 UJ |
| Benzo(a)anthracene | SW8270D | | **14 J** |
| Benzo(a)pyrene | SW8270D | | **12 J** |
| Benzo(b,j,k)fluoranthenes | SW8270D | | **32 J** |
| Benzo(g,h,i)perylene | SW8270D | | 19 U |
| Chrysene | SW8270D | | **20** |
| Dibenzo(a,h)anthracene | SW8270D | | 19 UJ |
| Fluoranthene | SW8270D | | **32** |
| Fluorene | SW8270D | | **6.6 J** |
| Indeno(1,2,3-c,d)pyrene | SW8270D | | **11 J** |
| Naphthalene | SW8270D | | **13 J** |
| Phenanthrene | SW8270D | | **22** |
| Pyrene | SW8270D | | **38** |
| Total HPAH (SMS) (U = 0) | | | **159 J** |
| Total LPAH (SMS) (U = 0) | | | **52.6 J** |

**Table 3**

**Final Validated Jorgensen Forge Outfall Site Shoreline Bank Z-layer Results**

| | | Location ID | PDS-7 |
|---|---|---|---|
| | | Sample ID | JF-PDS-7-140719 |
| | | Sample Date | 07/19/2014 |
| | | Depth | 0 - 12 in |
| **PCB Aroclors (µg/kg)** | | | |
| Aroclor 1016 | SW8082A | | 510 UJ |
| Aroclor 1221 | SW8082A | | 510 UJ |
| Aroclor 1232 | SW8082A | | 510 UJ |
| Aroclor 1242 | SW8082A | | 510 UJ |
| Aroclor 1248 | SW8082A | | **3700 J** |
| Aroclor 1254 | SW8082A | | **8200 J** |
| Aroclor 1260 | SW8082A | | **1700 J** |
| Total PCB Aroclors (U = 0) | | | **13600 J** |

Notes:

**Bold = Detected result**

µg/kg = micrograms per kilogram

cm = centimeter

J = Estimated value

mg/kg = milligrams per kilogram

OC = organic carbon

PCB = polychlorinated biphenyl

pct = percent

R = Rejected

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

# ATTACHMENT D
# PRE- AND POST-CONSTRUCTION PERIMETER SAMPLING

**Table 1**
**Final Validated Jorgensen Forge Early Action Area Surface Sediment Pre- and Post-Construction Perimeter Sample Results**

| Location ID | PMN-1 | PMN-1 | PMN-2 | PMN-2 | PMN-2 | PMN-3 | PMN-3 | PMN-4 | PMN-4 | PMN-5 | PMN-5 | PMN-6 | PMN-6 | PMU-1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | JF-PMN-1-140708 | JF-PMN-1-140915 | JF-PMN-2-140708 | JF-PMN-1002-140708 | JF-PMN-2-140915 | JF-PMN-3-140708 | JF-PMN-3-140915 | JF-PMN-4-140708 | JF-PMN-4-140915 | JF-PMN-5-140708 | JF-PMN-5-140916 | JF-PMN-6-140708 | JF-PMN-6-140915 | JF-PMU-1-140708 |
| Sample Date | 07/08/2014 | 09/15/2014 | 07/08/2014 | 07/08/2014 | 09/15/2014 | 07/08/2014 | 09/15/2014 | 07/08/2014 | 09/15/2014 | 07/08/2014 | 09/16/2014 | 07/08/2014 | 09/15/2014 | 07/08/2014 |
| Depth | 0 - 10 cm | 0 - 10 cm | 0 - 10 cm | 0 - 10 cm | 0 - 10 cm | 0 - 10 cm | 0 - 10 cm | 0 - 10 cm | 0 - 9 cm | 0 - 10 cm | 0 - 10 cm | 0 - 10 cm | 0 - 9.5 cm | 0 - 10 cm |
| Sample Type | N | N | N | FD | N | N | N | N | N | N | N | N | N | N |
| **Conventional Parameters (pct)** | | | | | | | | | | | | | | |
| Total organic carbon | **1.16** | **1.84** | **1.49** | **1.01** | **2.7** | **0.959** | **1.2** | **0.97** | **1.48** | **0.699** | **1.79** | **1.08** | **1.82** | **1.44** |
| Total solids | **48.22** | **49.4** | **54.39** | **51.65** | **56.09** | **60.28** | **62.28** | **61.54** | **59.22** | **60.96** | **60.8** | **57.49** | **59.28** | **52.08** |
| **Grain Size (pct)** | | | | | | | | | | | | | | |
| Gravel | **0.2** | 0.1 U | 0.1 U | **0.1** | **0.2** | **0.6** | **0.4** | **0.1** | 0.1 U | **0.1** | 0.1 U | **0.1** | **0.1** | **0.9** |
| Sand, very coarse | **0.6** | **1.1** | **0.4** | **0.4** | **0.9** | **0.7** | **1.2** | **0.3** | **0.7** | **0.4** | **0.4** | **0.4** | **0.4** | **0.8** |
| Sand, coarse | **0.9** | **1.7** | **1** | **0.9** | **2.7** | **1.1** | **8.3** | **0.7** | **1.5** | **1.1** | **1.1** | **0.8** | **1** | **1.7** |
| Sand, medium | **2.5** | **1.7** | **3.7** | **3.6** | **9** | **2.7** | **21.7** | **2.2** | **4.4** | **2.5** | **2.7** | **1.8** | **2.5** | **4.1** |
| Sand, fine | **3.4** | **4.3** | **7.7** | **7** | **10.5** | **18.1** | **14.7** | **16** | **21.2** | **16.8** | **17.3** | **11.3** | **13.3** | **5.3** |
| Sand, very fine | **9.7** | **11.5** | **14.8** | **15.5** | **15.3** | **29.7** | **16.9** | **27.8** | **22.5** | **32.3** | **29.5** | **22.1** | **26** | **14.6** |
| Silt, coarse | **18.1** | **19.6** | **18.7** | **18.9** | **15.6** | **15.5** | **11.4** | **18.2** | **14.9** | **16** | **15.4** | **21** | **17** | **23.7** |
| Silt, medium | **23.1** | **21.8** | **16.7** | **16.9** | **15.3** | **10.2** | **6.9** | **10.9** | **10.8** | **10.2** | **11.3** | **13.5** | **12.8** | **20.7** |
| Silt, fine | **20.4** | **19.8** | **12.8** | **12.3** | **11** | **7.3** | **8** | **7.9** | **8** | **6.7** | **7.6** | **9.9** | **9.6** | **11.9** |
| Silt, very fine | **6.1** | **6.2** | **8** | **8** | **6.5** | **4.4** | **2.5** | **5.2** | **5.5** | **4.5** | **5.1** | **6.7** | **6.5** | **5.9** |
| Clay, coarse | **4.8** | **3.2** | **4.7** | **5.7** | **4.1** | **3** | **2.4** | **3.4** | **3.4** | **3.1** | **3** | **3.9** | **3.4** | **3.3** |
| Clay, medium | **3.2** | **2.8** | **4** | **3.5** | **3.1** | **2** | **1.9** | **2.1** | **2.5** | **2** | **2.1** | **2.7** | **2.6** | **2.1** |
| Clay, fine | **7.2** | **6.3** | **7.5** | **7.2** | **5.8** | **4.8** | **3.6** | **5.3** | **4.6** | **4.5** | **4.5** | **5.8** | **4.7** | **4.9** |
| **Metals (mg/kg)** | | | | | | | | | | | | | | |
| Arsenic | **11.2** | **8.8** | **9.1** | **8.2** | **8.9** | **6.8** | **6** | **6.6** | **7.5** | **6.1** | **6.6** | **7.4** | **7** | **8.4** |
| Cadmium | **0.3** | **0.4** | **0.3** | **0.3** | **0.3** | **0.2** | **0.2** | **0.2** | **0.2** | **0.155 J** | **0.2** | **0.2** | **0.2** | **0.3** |
| Chromium | **29** | **31** | **31.6** | **24.2** | **30** | **17.8** | **25.6** | **50** | **22.1** | **19.5** | **23.2** | **22.7** | **24** | **22.9** |
| Copper | **64** | **49** | **44.9** | **43** | **41** | **28.9** | **32** | **33.5** | **32.9** | **29** | **32.2** | **35.4** | **31.4** | **36.1** |
| Lead | **38.1** | **33.5** | **75.3** | **25.1** | **24.6** | **10.6** | **18.6** | **12** | **14.4** | **9.5** | **13.5** | **13** | **13.5** | **16.7** |
| Mercury | **0.21** | **0.11** | **0.13** | **0.12** | **0.1** | **0.07** | **0.06** | **0.15** | **0.07** | **0.15** | **0.05** | **0.08** | **0.08** | **0.18** |
| Silver | **0.367 J** | **0.38 J** | **0.245 J** | **0.242 J** | **0.279 J** | **0.188 J** | **0.262 J** | **0.187 J** | **0.21 J** | **0.155 J** | **0.147 J** | **0.19 J** | **0.186 J** | **0.211 J** |
| Zinc | **126** | **118** | **114** | **95** | **99** | **70** | **78** | **85** | **85** | **67** | **78** | **85** | **77** | **85** |
| **PCB Aroclors (µg/kg)** | | | | | | | | | | | | | | |
| Aroclor 1016 | 9.4 U | 9.5 U | 9.6 U | 9.3 U | 9.5 U | 9.9 U | 9 U | 10 U | 8.8 U | 9.9 U | 8.8 U | 9.7 U | 9 U | 9.1 U |
| Aroclor 1221 | 9.4 U | 9.5 U | 9.6 U | 9.3 U | 9.5 U | 9.9 U | 9 U | 10 U | 8.8 U | 9.9 U | 8.8 U | 9.7 U | 9 U | 9.1 U |
| Aroclor 1232 | 9.4 U | 9.5 U | 9.6 U | 9.3 U | 9.5 U | 9.9 U | 9 U | 10 U | 8.8 U | 9.9 U | 8.8 U | 9.7 U | 9 U | 9.1 U |
| Aroclor 1242 | 9.4 U | 9.5 U | 9.6 U | 9.3 U | 9.5 U | 9.9 U | 9 U | 10 U | 8.8 U | 9.9 U | 8.8 U | 9.7 U | 9 U | 9.1 U |
| Aroclor 1248 | 94 U | **120** | **69** | **60** | **73** | **22** | **56** | **22** | **28** | **38** | **22** | **24 J** | 22 U | **47 J** |
| Aroclor 1254 | **120 J** | **180** | **120 J** | **110 J** | **140** | **35 J** | **87** | **39 J** | **58** | **37 J** | **50** | **34 J** | **56** | **70 J** |
| Aroclor 1260 | **100 J** | **82** | **110 J** | **93 J** | **69** | **32 J** | **39** | **32 J** | **33** | **24 J** | **26** | **29 J** | **34** | **47 J** |
| Total PCB Aroclors (U = 0) | **220 J** | **382** | **299 J** | **263 J** | **282** | **89 J** | **182** | **93 J** | **119** | **99 J** | **98** | **87 J** | **90** | **164 J** |
| **PCB Aroclors (mg/kg-OC)** | | | | | | | | | | | | | | |
| Total PCB Aroclors (U = 0) | **18.9655 J** | **20.7609** | **20.0671 J** | **26.0396 J** | **10.4444** | **9.2805 J** | **15.1667** | **9.588 J** | **8.0405** | **14.1631 J** | **5.4749** | **8.0556 J** | **4.9451** | **11.3889 J** |

**Table 1**
**Final Validated Jorgensen Forge Early Action Area Surface Sediment Pre- and Post-Construction Perimeter Sample Results**

| Location ID | PMU-1 | PMU-2 | PMU-2 | PMU-3 | PMU-3_2014 | PMU-4 | PMU-4 | PMU-5 | PMU-5 | PMU-5 (Duplicate) | PMU-6 | PMU-6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | JF-PMU-1-140915 | JF-PMU-2-140708 | JF-PMU-2-140915 | JF-PMU-3-140709 | JF-PMU-3-140916 | JF-PMU-4-140709 | JF-PMU-4-140916 | JF-PMU-5-140709 | JF-PMU-5-140915 | JF-PMU-105-140915 | JF-PMU-6-140709 | JF-PMU-6-140916 |
| Sample Date | 09/15/2014 | 07/08/2014 | 09/15/2014 | 07/09/2014 | 09/16/2014 | 07/09/2014 | 09/16/2014 | 07/09/2014 | 09/15/2014 | 09/15/2014 | 07/09/2014 | 09/16/2014 |
| Depth | 0 - 10 cm | 0 - 10 cm | 0 - 10 cm | 0 - 10 cm | 0 - 10 cm | 0 - 10 cm | 0 - 9 cm | 0 - 10 cm | 0 - 10 cm | 0 - 10 cm | 0 - 10 cm | 0 - 9.5 cm |
| Sample Type | N | N | N | N | N | N | N | N | N | FD | N | N |
| **Conventional Parameters (pct)** | | | | | | | | | | | | |
| Total organic carbon | **1.73** | **0.663** | **1.73** | **1.22 J** | **1.53** | **2.03 J** | **0.901** | **1.55 J** | **1.97** | **1.74** | **1.24 J** | **1.42** |
| Total solids | **62.09** | **61.2** | **59.09** | **58.67** | **66.28** | **75.31** | **59.72** | **50.88** | **53.03** | **52.88** | **59.18** | **58.86** |
| **Grain Size (pct)** | | | | | | | | | | | | |
| Gravel | **0.2** | **2.2** | **5.4** | **0.2** | **0.9** | **61.9** | **38.2** | 0.1 U | 0.1 U | 0.1 U | **0.3** | **0.2** |
| Sand, very coarse | **1.1** | **1.8** | **3.9** | **1.6** | **2.3** | **5.1** | **2.6** | **0.5** | **0.9** | **0.9** | **0.7** | **0.9** |
| Sand, coarse | **6** | **4.9** | **6.3** | **5.3** | **10.9** | **6.6** | **3.1** | **0.8** | **1.7** | **1.8** | **2.1** | **3.2** |
| Sand, medium | **17.8** | **36.1** | **27.5** | **12.4** | **27.3** | **11** | **7.8** | **1.4** | **2.8** | **2.9** | **7.1** | **11.1** |
| Sand, fine | **13** | **16.5** | **18.4** | **9.6** | **18.4** | **6.5** | **10.2** | **2.9** | **4.3** | **4.3** | **17** | **18.3** |
| Sand, very fine | **16.7** | **8.1** | **10.1** | **14.6** | **9.8** | **2** | **9.1** | **14** | **16.1** | **16.7** | **18.9** | **18.9** |
| Silt, coarse | **14.7** | **8.4** | **6.4** | **20.1** | **11.7** | **2.8** | **10.9** | **21.4** | **24.3** | **21.4** | **16.1** | **13.8** |
| Silt, medium | **10.8** | **5.8** | **5.8** | **15.2** | **6.7** | **1.1** | **6** | **25.9** | **19.7** | **21.9** | **12.7** | **11.4** |
| Silt, fine | **7.1** | **4.6** | **4.4** | **8.1** | **4** | **0.8** | **3.9** | **14.5** | **12.5** | **12.1** | **9.3** | **7.9** |
| Silt, very fine | **4.5** | **3.6** | **3.7** | **4.1** | **2.5** | **0.7** | **2.7** | **6.2** | **7.1** | **7.1** | **5.3** | **4.9** |
| Clay, coarse | **2.5** | **2.8** | **2.5** | **3** | **1.6** | **0.6** | **2.1** | **4.4** | **3.3** | **3.6** | **3.8** | **3.2** |
| Clay, medium | **1.6** | **1.8** | **2** | **1.7** | **1.3** | **0.3** | **1.1** | **2.5** | **2.7** | **2.2** | **2.5** | **2.5** |
| Clay, fine | **4.1** | **3.5** | **3.6** | **4.1** | **2.6** | **0.5** | **2.2** | **5.4** | **4.6** | **5.3** | **4.3** | **3.7** |
| **Metals (mg/kg)** | | | | | | | | | | | | |
| Arsenic | **15.5** | **219** | **250** | **22.9 J** | **45.1** | **19.4 J** | **31.4** | **7.7 J** | **9** | **9.5** | **17.2 J** | **12.2** |
| Cadmium | **0.2** | **5.8** | **0.4** | **1.1** | **0.7** | **0.8** | **0.4** | **0.3** | **0.3** | **0.4** | **0.5** | **0.5** |
| Chromium | **25.4** | **97.5** | **35.4** | **37.5 J** | **28.6** | **72.6 J** | **30.6** | **25.1 J** | **27** | **29** | **30.7 J** | **35.1** |
| Copper | **36.3** | **82.3** | **48** | **33.6** | **33.3** | **143** | **43.7** | **41.1** | **39** | **39.7** | **46.7** | **43.2** |
| Lead | **35** | **157** | **86.5** | **28.7** | **39.5** | **271** | **54.3** | **23** | **39.2** | **31.9** | **58.9** | **74.9** |
| Mercury | **0.1** | **0.09** | **0.06** | **0.07 J** | **0.04** | **0.05 J** | **0.1** | **0.1 J** | **0.08** | **0.09** | **0.19 J** | **0.08** |
| Silver | **0.291 J** | **5.6** | **0.229 J** | **0.5 J** | **0.6 J** | **0.6 J** | **0.225 J** | 0.4 UJ | **0.249 J** | **0.26 J** | **0.4 J** | **0.4 J** |
| Zinc | **89** | **237** | **204** | **96** | **101** | **920** | **138** | **96** | **96** | **105** | **110** | **116** |
| **PCB Aroclors (µg/kg)** | | | | | | | | | | | | |
| Aroclor 1016 | 9.6 U | 9.9 U | 9.9 U | 9 U | 8.7 U | 94 U | 8.9 U | 9.1 U | 48 U | 9.9 U | 96 U | 9 U |
| Aroclor 1221 | 9.6 U | 9.9 U | 9.9 U | 9 U | 8.7 U | 94 U | 8.9 U | 9.1 U | 48 U | 9.9 U | 96 U | 9 U |
| Aroclor 1232 | 9.6 U | 9.9 U | 9.9 U | 9 U | 8.7 U | 94 U | 8.9 U | 9.1 U | 48 U | 9.9 U | 96 U | 9 U |
| Aroclor 1242 | 9.6 U | 9.9 U | 9.9 U | 9 U | 8.7 U | 94 U | 8.9 U | 9.1 U | 48 U | 9.9 U | 96 U | 9 U |
| Aroclor 1248 | **72** | **44 J** | **51** | **33** | 260 U | 94 U | **48** | **33** | **92** | **78** | **400** | **150** |
| Aroclor 1254 | **180** | **120 J** | **180** | **98 J** | **2400** | **610 J** | **140** | **76 J** | **210** | **150** | **790 J** | **350** |
| Aroclor 1260 | **100** | **110 J** | **83** | **75** | 170 U | **110** | **69** | **29** | **90** | **65** | **130** | **110** |
| Total PCB Aroclors (U = 0) | **352** | **274 J** | **314** | **206 J** | **2400** | **720 J** | **257** | **138 J** | **392** | **293** | **1320 J** | **610** |
| **PCB Aroclors (mg/kg-OC)** | | | | | | | | | | | | |
| Total PCB Aroclors (U = 0) | **20.3468** | **41.3273 J** | **18.1503** | **16.8852 J** | **156.8627** | **35.468 J** | **28.5239** | **8.9032 J** | **19.898** | **16.8391** | **106.452 J** | **42.9577** |

Notes:
**Bold = Detected result**
µg/kg = micrograms per kilogram
cm = centimeter
J = Estimated value
mg/kg = milligrams per kilogram
OC = organic carbon
PCB = polychlorinated biphenyl
pct = percent
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit

# ATTACHMENT E
# REQUEST FOR MODIFICATION COMMUNICATIONS

Pacific Pile & Marine, LP
700 South Riverside Drive
Seattle, WA 98108

T 206 331-3873
F 206 774-5958
License # PACIFPM922J3

# REQUEST FOR MODIFICATIONS

| | | | |
|---|---|---|---|
| **Date:** | July 24, 2014 | **Project** | Jorgensen Early Action Area |
| **From:** | Wilbur "JC" Clark | **RFV Number:** | JEAA-001 |
| **To:** | Mike Roberts | **Re:** | Pile Pulling |

**Modification Requested:**

☐ **Material:**
☐ **Specification:**
☒ **RAWP:** **App. D-Section 4.2**, **App. E- Section 3**

**Description of Modification:**
The ability to extract piling using the land based excavators.

**Attach supporting information from:** ☐ **Subcontractor** ☐ **Supplier**

**Reason for Modification:**
In Appendix E Section 3 identifies debris (piling, concrete, slag) removal being performed with the upland excavator for bank/inter-tidal piling. Appendix D Section 4.2 identifies in-water pile removal using the 1200 Hitachi. Both of these work activities will still proceed as described in the RAWP, however PPM is providing clarification on how the bank/inter-tidal piling will be removed.
The piling will be removed using the excavator equipped with bucket and thumb (method is similar to a choker and crane method) to grab and attempt to dead pull the piling vertically. If this method is successful, the piling will be extracted in 2-16' sections and loaded directly into the articulating truck staged on the top of bank. The 2-16' sections will be created by the bucket and thumb shearing the timber. No hand tools or chainsaws will be used to generate the sections.
If the piling cannot be dead pulled, then the excavator will shear the piling in 2-16' sections starting from the top continuing down to 3-feet below finished grade (top of required excavation elevation) as required by the Contract Specifications. The pile sections will be placed directly into the articulating trucks for placement in the USSA.

| Contractors Name | Pacific Pile & Marine, L.P. | Date: | 7/24/14 |
|---|---|---|---|

**Modification Response:**

☒ **Approved:** Shawn Blocker, EPA, via e-mail on 7/29/14 - 9:17 am
☐ **Resubmit:**
☐ **Denied:**

| | | | |
|---|---|---|---|
| Owner/ Prime Contractors Name | | Date: | |
| Owner/ Prime Contractors Signature | | Date: | |

Pacific Pile & Marine, LP
700 South Riverside Drive
Seattle, WA 98108

T 206 331-3873
F 206 774-5958
License # PACIFPM922J3

# REQUEST FOR MODIFICATIONS

| | | | |
|---|---|---|---|
| **Date:** | July 24, 2014 | **Project** | Jorgensen Early Action Area |
| **From:** | Wilbur "JC" Clark | **RFV Number:** | JEAA-002 |
| **To:** | Mike Roberts | **Re:** | Debris Export Trucks |

**Modification Requested:**

☐ **Material:**
☐ **Specification:**
☒ **RAWP:** **App. H- Section 3.1, 4.4**

**Description of Modification:**
The ability to use 40yd modal containers, take directly to Union Pacific Rail Yard, and dispose of at Columbia Ridge Landfill

**Attach supporting information from:** ☐ **Subcontractor** ☐ **Supplier**

**Reason for Modification:**
Waste Management has requested the use of 40yd modal containers, with 6mil polyethylene installed consistent with the RAWP, to export the debris material. WM will send the containers directly to Union Pacific's rail yard since the modal containers eliminate the need for transfer at the Alaska Street Reload Facility (ASRF). This will eliminate the need for rehandling at the ASRF because the debris will ultimately be loaded into 40yd modal containers regardless. Also, Waste Management is requiring the materials be transported to the Columbia Ridge Landfill, which is approved for disposal of Subtitle D materials on this project. The Greater Wenatchee Regional Landfill will not be used on this project.
All other methods, procedures, and QC/QA in the RAWP will be followed; only the container type, initial holding facility, and disposal facility will change.

| | | | |
|---|---|---|---|
| Contractors Name | Pacific Pile & Marine, L.P. | Date: | 7/24/14 |

**Modification Response:**

☐ **Approved:**
☐ **Resubmit:**
☐ **Denied:**

| | | | |
|---|---|---|---|
| Owner/ Prime Contractors Name | | Date: | |
| Owner/ Prime Contractors Signature | | Date: | |

Pacific Pile & Marine, LP
700 South Riverside Drive
Seattle, WA 98108

T 206 331-3873
F 206 774-5958
License # PACIFPM922J3

# REQUEST FOR MODIFICATIONS

| | | | |
|---|---|---|---|
| **Date:** | July 24, 2014 | **Project** | Jorgensen Early Action Area |
| **From:** | Wilbur "JC" Clark | **RFV Number:** | JEAA-003 |
| **To:** | Mike Roberts | **Re:** | Night Work |

**Modification Requested:**

☐ **Material:**
☐ **Specification:**
☒ **RAWP:** **Appen E- Section 2.3**
**Appen J- Section 2.3**

**Description of Modification:**
Clarification regarding the hours of operations for excavation and backfill.

**Attach supporting information from:** ☐ **Subcontractor** ☐ **Supplier**

**Reason for Modification:**
This modification serves to clarify the Appendix E & J Section 2.3 regarding the hours of operations. Both Appendixes allow for 24-hour operations for the excavating/dredging and shoreline/backfill activity. The current CPM schedule has assumed a certain amount of night work and if night work is not allowed the schedule would not be achievable.

Night work is required for two reasons. First, it is a means and methods necessary to reach the intertidal area that is out of the reach of the upland excavator. Only high tides can grant the barge access to reach the intertidal areas due to draft constrictions of the Web barge and reach of the 1200 excavator. Second, the ability to work at night will give additional flexibility with the work operations to meet the project schedule. Due to the force majeure impact from the Union Pacific fires the ability to backfill at night will help accelerate the schedule once the dredging operations are complete. A second crew will be used to backfill 24 hours a day until the schedule has sufficient float to ensure the project will be completed on time.

**Health and Safety Plan.** The attached Section 14.28 to the PPM Health and Safety Plan (HASP) (Appendix A-2 of the Removal Action Work Plan), is provided to outline safety requirements that will be implemented by PPM crews for any night work that is undertaken.

| | | | |
|---|---|---|---|
| Contractors Name | Pacific Pile & Marine, L.P. | Date: | 7/28/14 |

**Modification Response:**

☐ **Approved:** _____

☐ **Resubmit:** _____

☐ **Denied:** _____

| | | | |
|---|---|---|---|
| Owner/ Prime Contractors Name | | Date: | |
| Owner/ Prime Contractors Signature | | Date: | |

ANCHOR QEA

# REMOVAL ACTION WORK PLAN (RAWP) MODIFICATION REQUEST (RFM)

## RFM-004

| | | | |
|---|---|---|---|
| RAWP Section: | **Appendix C, Attachment C – Hazardous Materials Management Plan** | RAWP Subsection: | 6.0 Spill Response Procedures |
| Project Name: | Jorgensen Forge Early Action Area Removal Action | Project No: | 080224-01.02 |
| Contractor: | Pacific Pile & Marine, LC | Date: | July 29, 2014 |

## Background and Investigation:

On July 29, 2014, at approximately 1400, sheen was identified as seeping from the shoreline bank along an area approximately 30 feet downstream/south of the existing sheetpile wall. The sheen migrated downslope and pooled at the base of the recently excavated toe of slope just above the Lower Duwamish Waterway (LDW) surface. Shawn Blocker of EPA was present and issued an order to stop the leakage from the shoreline and prevent any sheen from entering the LDW. In response to this order, the following Emergency Response actions were undertaken by the Pacific Pile & Marine (PPM), under the direction of Anchor QEA:

- Placed geotextile fabric on the bank overlying the location of the seeps and weighted down with the recently imported backfill material (previously proposed to be used within the cofferdam) stockpiled onsite.
- Placed oil absorbent booms along the interior of the existing silt curtain within the LDW to fully encompass the identified sheen generation area. As an added preventative measure, additional supplemental oil absorbent booms were also deployed downstream, channelward of the silt curtain.
- Installed a section of silt curtain adjacent to the downstream cofferdam, and deployed south of the primary silt curtain, creating a double silt curtain system downstream of the seeps.

In addition to the above actions, Anchor QEA conducted the following Emergency Response actions:

- Collected a sample of the sheen and immediately brought to lab to test for polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and gasoline, diesel and residual range total petroleum hydrocarbons (TPH)
- Made the required emergency notifications (Ecology Spill Response, Washington State Emergency Management, National Response Center) identified in the Removal Action Work Plan (RAWP) and associated permit documents.

On July 29, 2014, PPM and Anchor QEA arrived at the site at first daylight and confirmed the silt curtain, oil absorbent booms, and shoreline bank filter fabric were effective at containing the sheen and no additional sheen was observed seeping from the bank. At approximately 1125, PPM completed an approximately 10 foot deep pothole in the presence of Anchor QEA, and USACE using the mini-excavator to assess the nature of the subsurface soils just landward of the identified seeps. The pothole was conducted approximately 25 feet north of the existing sheetpile wall, approximately 5 feet inland of the top of bank. Material consisted of approximately 4 inches of asphalt overlying fill. The fill was completely dry, and consisted of approximately 4 feet of coarse gravel and cobbles, overlaying a medium to fine sand. Wood fragments and slag were present through the entire fill layer. No sheen was observed or other observations that would indicate a source of the identified shoreline bank sheen.

In discussions between Anchor QEA and PPM, continued trenching along the top of bank has several drawbacks, which include the following:

- Stability of the trench may be compromised due to the amount of debris within the pothole, and limited access on either side of the trench. The deeper the trench extends, the wider the sideslopes will need to be, which will further encroach on the existing shoreline and upland site.
- A significant amount of soil will be generated onsite due to the larger bucket, as well as the size of the excavation which must be conducted to achieve additional depth.

Due to the above, Anchor QEA and PPM propose to continue conducting shoreline excavation outside the area of concern (as identified by EPA) and the pile removal (site-wide) with an EPA approved contingency plan in place. Simultaneously, Anchor QEA

will conduct additional, less-intrusive explorations (i.e., hand auger) along the shoreline in an attempt to locate the source of the sheen, as well as obtain soil samples for analysis. The contingency plan as well as additional exploration plan is proved in the following section.

## Summary of proposed revisions, justifications, and rational to EPA-approved RAWP:

**Shoreline Contingency Plan**: As discussed in the above Background Section, Anchor QEA and PPM request approval to continue completing shoreline excavation (outside the area of concern as identified by EPA) and pile pulling operations simultaneously with additional shoreline bank exploration conducted by Anchor QEA. PPM will continue the shoreline excavation in accordance with the below Contingency Plan in place, to ensure that if any additional seeps are identified, they are appropriately contained and minimized to minimize releases to the LDW. The below plan is a modified version of the Emergency Response which describe above, in which observations during low tide today indicated that the response was effective. The shoreline excavation and pile pulling operations (RFM-001) will be conducted in unison, to allow for a smooth surface which will increase the effectiveness of the Contingency Plan.

The Contingency Plan in the event of seep generation is:

1. Collect soil and water samples, if possible.
2. Upon achieving design grade, place a non-woven geotextile along the excavated bank in which the seeps exist.
3. Place imported 1-1/4" minus clean crushed gravel to weigh down the geotextile and surcharge the slope, at an approximate depth of 3-inches. Prior to use onsite, analytical testing will be requested from the quarry and provided to the EPA for their approval of the import material. Note that this material is sacrificial, and will be excavated and disposed at a Subtitle-D landfill (Columbia Ridge) prior to the placement of the imported shoreline containment materials.
    - This crushed gravel will be imported from a quarry source and temporarily stockpiled on top of plastic so as not to touch the base of the exclusion zone, which could cause cross-contamination. In addition, the imported material will not be driven over by haul trucks or equipment which has touched the base of the exclusion zone. After the material has been dumped, the pile will be immediately covered by the end of the shift, to prevent airborne contamination.
    - Prior to placing the crushed gravel on the slope, the excavator bucket which is to be used for placement will be decontaminated in accordance to the RAWP procedures.
4. Placement of oil booms along the silt fence. Additional oil booms may be implemented at the request of Anchor QEA, EPA, or USACE.
5. Upon characterization of any area of concern, EPA will make a determination if further modifications are necessary prior to continuation of work.

**Additional Exploration Plan**: As discussed in the above Background Section, the test pit conducted today indicated that there appears to be no near below grade source present causing the seeps identified on July 28, 2014. Due to slope stability, material generation, and safety concerns, Anchor QEA feels a less intrusive exploration method would be safer, and may provide better information while allowing for the shoreline work to continue.

We propose to conduct a series of hand augers along the bank where the seeps originally occurred. The hand augers can extend to a depth of approximately 5 feet, and can be conducted at various locations in an attempt to obtain more information about the potential source of the observed sheen. In addition, the use of the hand auger is much less invasive then the excavator in which locations can be modified easily based on the material found. We will also obtain samples of the material where the seeps occur, and will send them to the laboratory to test for PCBs, PAHs, and TPH. Following receipt and review of these results, will then determine if any shoreline bank design changes may be needed and coordinate these changes with EPA.

**Approved By** *(Not valid until signed by EPA)*

**Approval Recommended – Anchor QEA CM**

| | | |
|---|---|---|
| Ryan Barth, PE, Project Engineer | | |
| *(Print name)* | *Signature* | *Date* |
| Mike Roberts, PE, CCM | | 7.29.14 |
| *(Print name)* | *Signature* | *Date* |

**Approved by Owner**

| | | |
|---|---|---|
| Rich McManus, PE, Owners Representative | | |
| *(Print name & title)* | *Signature* | *Date* |

**EPA**

| | | |
|---|---|---|
| Shawn Blocker, Unit Manager | | 7/29/14 |
| *(Print name & title)* | *Signature* | *Date* |

**Attachments:** None

**Copies:** Contractor *(Original & PDF)*
Owner *(Original & PDF)*
File

# REMOVAL ACTION WORK PLAN (RAWP) MODIFICATION REQUEST (RFM)

# RFM-005

| | | | |
|---|---|---|---|
| RAWP Section: | **Appendix C, Attachment C – Hazardous Materials Management Plan** | RAWP Subsection: | 6.0 Spill Response Procedures |
| Project Name: | Jorgensen Forge Early Action Area Removal Action | Project No: | 080224-01.02 |
| Contractor: | Pacific Pile & Marine, LC | Date: | August 5, 2014 |

## Background and Investigation:

As discussed with Shawn Blocker and consistent with the approved Contingency Plan (RFM-004) , Anchor QEA performed some shoreline bank reconnaissance excavations and sampling using hand tools on July 30 to further investigate the potential cause of the sheen seeping on the bank on July 28. Below is a summary of the performed activities:

- During low tide conditions, Anchor QEA personnel used shovels to hand excavate five locations, spatially separated by approximately 3- to 5-feet, to expose conditions beneath the gravel and filter fabric placed along the southern portion of the bank on the evening of July 28 due to the observed sheen seeping on the bank.
- A hole was cut into the filter fabric in all locations to provide access to the underlying contained shoreline bank and an approximately 8 to 12 inch hole was dug into the bank face. The holes were approximately along the portion of the bank exhibiting sheen and dark colored sediment with petroleum odor and sheen on July 28. The holes were within the tidal and groundwater discharge elevations.
- The encountered materials throughout the hole were visually characterized and odor was noted.
- Using decontaminated sampling utensils, one sample was collected of the dark colored sediment identified from the upper 0 to 4 inches from each of two separate holes and placed into jars. A single sample was collected of the material underlying the dark colored sediment. These samples were placed into labeled jars and stored on ice for potential future analysis (pending proposed additional actions detailed below).
- The shoreline bank upstream, downstream, and along the recently cut toe of slope were visually monitored for any signs of recent sheen generation.

Below is a summary of findings based on the above activities.

- In four of the holes (the fifth hole could not be successfully excavated due to constant caving), the dark colored material with petroleum odor and sheen only penetrated approximately 3 to 4 inches below ground surface. The full depth of material underlying this dark colored material (approximately 8 to 9 inches) consisted of a brown, gravelly-sand material that exhibited no petroleum odor, no sheen, or other visual signs of contamination. These findings indicate the observed discolored materials are limited to a shallow localized deposit within the fill. Additional minor excavation (approximately 6 inches in depth based on reconnaissance findings) should remove this material and expose the underlying material that did not exhibit staining/sheen.
- No sheen was observed seeping from the bank in any of the five holes or along the bank upstream, downstream, or channelward of the filter fabric area. This provides evidence the placement of filter fabric with overlying rock successfully contained the sheen and the sheen generation identified on July 28 was limited to the isolated area around the filter fabric area.
- No new sheen was identified in the Lower Duwamish Waterway. Diffuse sheen identified in the waterway consistent with observations following implementation of corrective actions on evening of July 29 and fully contained within the silt curtain and inner oil containment booms.

Observations indicating that the source of the sheen observed on July 28 is a shallow localized deposit of petroleum impacted material is consistent with prior site investigations and examination of bank conditions conducted since 2004. Groundwater monitoring performed numerous times in the monitoring well cluster (MW-42/43/44) and individual well (MW-47) located along

the top of bank in the direct vicinity of the petroleum impacted area, identified no LNAPL, and no TPH or BTEX or PAHs or SVOCs detections. Visual observations conducted of bank conditions on numerous occasions in the past 10 years did not reveal any sheen seeps. Therefore, as reported in the site Source Control Evaluation Report Addendum (Anchor QEA 2011), there are no visual observations or GW data suggesting a source loading, especially oil, proximate to the shoreline bank.

## Summary of proposed revisions, justifications, and rational to EPA-approved RAWP:

Based on the above findings, EMJ proposes the following path forward.

- During low tide elevations, expected to occur on July 31 or August 1 between approximately 1300 and 1500 hours, use the shoreline bank excavator to remove the gravel and underlying filter fabric placed on the bank on July 28, place directly into articulated trucks, and dump into upland storage/stockpile area (USSA) on liner segregated from other materials in USSA.
- Using the shoreline excavator, remove material down to the Required Dredge Line grade or an additional approximate 6 inches (whichever is greater) of material from the newly exposed area where bank sheen and dark discolored materials were observed.
- Visually observe the newly exposed surface to determine if any bank sheen is present and/or materials exist on the surface that could lead to sheen with groundwater discharging through it.
    - If no sheen or these materials are present on surface, in four spatially separated locations excavate an additional approximately 6 inches below ground surface to confirm no sheen or these materials present further beneath the surface. If confirmed, no additional action.
    - If sheen or these materials are present in the exposed surface OR four confirmatory locations identified above, perform additional shallow excavation to attempt to remove any perceived source materials. Continue stepwise excavation and evaluation until PPM or Anchor QEA determine no further excavation can be performed (e.g., due to slope stability concerns, access, etc.).
- If excavation removes all visible “source” material believed to have caused the bank sheen AND no additional sheen is observed emanating from the bank following the excavation, no revisions necessary to the existing shoreline bank containment and no additional filter fabric and overlying gravel placement necessary (per the EPA approved Contingency Plan, RFM-004, approved on July 29).
- If excavation does not remove all visible “source” material believed to have caused the bank sheen OR additional sheen is observed emanating from the bank following the excavation activities:
    - Per the Contingency Plan, place additional filter fabric over the bank area of concern and cover with clean imported backfill (1.25-inch crushed base course) containing chemical concentrations below the Action Memorandum thresholds. The material has been brought to the site today, and is currently stockpiled outside of the Exclusion Zone to ensure there is no cross-contamination. The filter fabric and overlying backfill would serve as a continued intermediate corrective action to minimize potential for sheen releases to the waterway. Continued visual monitoring would be performed to evaluate potential for additional sheen releases and additional potential corrective actions.
    - Anchor QEA develop expedited revised shoreline bank containment remedy protective of identified source materials and observed sheen generation, and submit to EPA for expedited review.
    - Anchor QEA coordinate EPA-approved design modification with PPM and install as necessary prior to September 6 in-water construction deadline.

With your approval of the above path forward, utilizing the approved Contingency Plan (RFM-004), we would like to confirm that PPM is allowed full access to the shoreline to complete the shoreline excavation activities. Please let us know if you have any questions regarding this submittal.

## Approved By *(Not valid until signed by EPA)*

| | | |
|---|---|---|
| Ryan Barth, PE, Project Engineer | | |
| *(Print name)* | *Signature* | *Date* |
| Mike Roberts, PE, CCM | | |
| *(Print name)* | *Signature* | *Date* |
| Rich McManus, PE, Owners Representative | | |
| *(Print name & title)* | *Signature* | *Date* |
| Shawn Blocker, Unit Manager | Approved by Shawn Blocker Email | 7/31/2014 at 11:34 am |
| *(Print name & title)* | *Signature* | *Date* |

**Attachments:** None

**Copies:** Contractor *(Original & PDF)*
Owner *(Original & PDF)*
File

# REMOVAL ACTION WORK PLAN (RAWP) MODIFICATION REQUEST (RFM)

## RFM-006

| | | | |
|---|---|---|---|
| | **Section 5 and Appendix J of the Removal Action Work Plan** | | Section 5.5.2 |
| | Jorgensen Forge Early Action Area Removal Action | | 080224-01.02 |
| | Pacific Pile & Marine, LC | | August 8, 2014 |

Section 5.5.2 and Appendix J of the EPA-approved Removal Action Work Plan (RAWP) identified the following sequence of work activities:

- Dredging in each dredge material management unit (DMU) completed to the required dredge elevations
- Document required dredge elevations achieved through completion of bathymetric survey
- Collect single "z-layer" surface sediment sample in DMU
- Place 6-inches of clean interim backfill throughout DMU

PPM is requesting to revise this sequence for DMU-1 and DMU-2 for the following reasons:

- Completion of dredging in DMU-1 was delayed due to the identification of a minor sheen coming from an exposed timber piling along the base of the sheetpile wall
- To continue dredging productivity, PPM proceeded with dredging in DMU-2 during Anchor QEA coordination with EPA regarding continuation of dredging in DMU-1
- During Anchor QEA coordination with EPA and subsequent completion of the bathymetric survey in DMU-1, PPM completed the majority of the required dredging within DMU-2

Due to the above sequence of events, dredging was completed in DMU-1 and DMU-2 at the same time. Therefore, PPM requests EPA approval to place the 6-inch clean interim backfill in both DMU's at the same time.

| | | |
|---|---|---|
| Ryan Barth, PE, Project Engineer | Ryan Barth | 8/8/2014 |
| *(Print name)* | *Signature* | *Date* |
| Mike Roberts, PE, CCM | | 8/8/2014 |
| *(Print name)* | *Signature* | *Date* |
| Amy Essig Desai, Owners Representative | | 8/8/2014 |
| *(Print name & title)* | *Signature* | *Date* |
| Rebecca Chu, Unit Manager | | |
| *(Print name & title)* | *Signature* | *Date* |

**Attachments:** None

**Copies:** Contractor *(Original & PDF)*
Owner *(Original & PDF)*

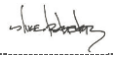
File

# REMOVAL ACTION WORK PLAN (RAWP) MODIFICATION REQUEST (RFM)

## RFM-007

| | | | |
|---|---|---|---|
| | **Section 5 and Appendices D, E, H and I of the Removal Action Work Plan** | | All applicable subsections |
| | Jorgensen Forge Early Action Area Removal Action | | 080224-01.02 |
| | Pacific Pile & Marine, LC | | August 11, 2014 |

Section 5 and Appendices D, E, H, and I of the EPA-approved Removal Action Work Plan (RAWP) identify specific construction equipment for use at the site. In order to achieve the EPA-approved removal action design, Contractor equipment may occasionally need to be exchanged for a different size, type, or equivalent model to adapt means and methods. This proposed RAWP modification follows the EPA-approved RAWP revision submitted by PPM "RFM 005 Excavator Change" and applies more generally to equipment that may need to be exchanged based on the needs of the project. PPM is requesting this RAWP revision to expedite the use of appropriate equipment as the need arises on the project. PPM will follow all applicable Best Management Practices (BMPs) to protect the environment and Health and Safety requirements identified in the Contract Documents and the EPA-approved RAWP when operating all substitute equipment.

| | | |
|---|---|---|
| Ryan Barth, PE, Project Engineer |  | 8/11/2014 |
| *(Print name)* | *Signature* | *Date* |
| Mike Roberts, PE, CCM |  | 8/11/2014 |
| *(Print name)* | *Signature* | *Date* |
| Amy Essig Desai, Owners Representative | | 8/11/2014 |
| *(Print name & title)* | *Signature* | *Date* |
| Rebecca Chu, Unit Manager | | |
| *(Print name & title)* | *Signature* | *Date* |

**Attachments:** None

**Copies:** Contractor *(Original & PDF)*
Owner *(Original & PDF)*
File

# REMOVAL ACTION WORK PLAN (RAWP) MODIFICATION REQUEST (RFM)

# RFM-008

| | | | |
|---|---|---|---|
| RAWP Section: | **Section 5.5 and Appendix J of the Removal Action Work Plan** | RAWP Subsection: | All applicable subsections |
| Project Name: | Jorgensen Forge Early Action Area Removal Action | Project No: | 080224-01.02 |
| Contractor: | Pacific Pile & Marine, LC | Date: | August 21, 2014 |

## Summary of Proposed Revisions and Rational to EPA-approved RAWP

Section 5.5 and Appendix J of the EPA-approved Removal Action Work Plan (RAWP) identify the hours of work for the placement of clean in-water backfill by Pacific Pile & Marine, LC (PPM). The Backfill Plan (Appendix J of the RAWP) allowed for backfill placement during a 10-hour shift from Sunday through Saturday and this shift would be scheduled throughout a calendar day based on construction sequencing and tidal elevations. However, for night time placement EPA requested additional information on measures that will be taken to minimize potential light and noise impacts to the surrounding community and minimize turbidity plumes. This information is summarized below.

**Proposed Night Time Work Schedule**

Night work is currently scheduled during placement of backfill, from Thursday August 27 through September 5, not including Saturday through Monday (August 30 to September 1) due to the Labor Day holiday.

**Noise Monitoring, Prevention, and Mitigation**

Anchor QEA coordinated with Roy Kuroiwa, the project lead for the Port of Seattle Terminal 117 Early Action Area Removal Action, regarding their EPA-approved plan for minimizing potential noise impacts to the surrounding South Park community during performance of night work. Roy summarized the procedures they followed, as detailed in the Terminal 117 Community Health and Safety Plan (CHASP). PPM is proposing to follow the same protocols, as summarized below.

The only construction activity proposed during night time hours is placement of clean backfill so potential noise impacts would be limited to that activity. No higher decibel activities such as pile driving are proposed. Specifically, noise impacts would be limited to the following activities:

- Excavator engine throttling
- Tug and barge relocation
- Swing and opening/closing of excavator bucket

*Noise Monitoring*

Noise generated from the above activities will be lower decibels over longer duration – not acute higher decibels like pile driving. Noise monitoring will be performed to achieve the industrial noise performance standards (Seattle Municipal Code [SMC] Chapter 25.08) established to minimize the effects of project-related noise on the quality of life in the surrounding community. The maximum permissible sound level is based on SMC 25.08.410, which sets a 60 decibel (dB[A]) limit for industrial to residential noise generation. SMC 25.08.425 allows a 25 dB(A) addition for construction activities, making the maximum permissible sound level at the receiving property 85 dB(A). As detailed in the Terminal 117 CHASP and corroborated during completion of the cleanup activities, continuous noise monitoring performed identified the noise levels were below the SMC construction noise limit. Therefore, it is anticipated that PPM's proposed work will be in compliance with noise requirements, especially given the greater distance from proposed backfilling activities to the nearest residents at the South Park Marina.

Anchor QEA will perform periodic background noise monitoring using a hand-held noise dosimeter during night time hours prior to performance of backfill placement at night. This information will support documentation of ambient noise levels in the absence of backfilling operations. During night time construction hours, the Anchor QEA inspector will perform noise monitoring periodically using a hand-held device at distances less than or equivalent to the nearest resident at the South Park Marina.

*Noise Prevention and Mitigation*

Noise monitoring data from the hand-held sound level meter will allow PPM to attempt to reduce excessive noise below the 85 Db(A) performance standard, if possible based on the background monitoring noise dB(A). If complaints are received by the community during periods that exceed the performance standard, PPM will implement specific noise reduction mitigation such as turning off excavator or phasing the use of noise-generating equipment.

**Lighting Monitoring, Prevention and Mitigation**

Performance of the backfill operations at night will require the use of artificial light to illuminate work areas to provide safe work conditions. The following monitoring, prevention and mitigation measures will be taken to minimize light nuisance to surrounding residences.

*Light Monitoring*

Lighting is measured in foot candles using a hand-held brightness meter. Based on the SMC (Chapter 23.50.046), the performance standard for acceptable light emissions to commercial/industrial areas is 1.0 foot candle. In addition to this standard, the SMC requires that exterior lighting originating from an industrial property be shielded and directed away from adjacent residential zones.

Evaluation of lighting levels will be conducted at the following times:

- Prior to the start of night work to evaluate background light levels on and around the construction work area
- At the time of installation of each lighting configuration to support construction
- When there is community complaints regarding excessive bright lights

*Light Prevention and Mitigation*

PPM will minimize potential nuisance light impacts through the use of equipment that complies with the performance standards and the use of shielding and directionality.

If light levels do create a disturbance to residences or LDW users, the following actions will be taken to identify the nuisance and mitigate the problem. Specific actions will be selected on a case-by-case basis and will only be used to the extent that they do not impede safe operations. These actions may include:

- Repositioning of lights
- Installation of buffers, barriers, or screens between specific light sources and community
- Repositioning of equipment, such as material barges or trucks, relative to the lighting source

**Water Quality Monitoring**

The 401 Water Quality Memorandum required that two rounds of turbidity monitoring be performed during a single day of backfill placement (Tier 3 monitoring requirement). Anchor QEA completed that requirement and no turbidity exceedances were identified at the 150-foot point of compliance (from backfill bucket placement).

The 401 Water Quality Memorandum also requires the performance of visual monitoring during in-water construction activities and notification and coordination with EPA if a visual turbidity plume is observed at approximately 150 feet from backfill placement location. The backfill material selected is identical to the material used for the Boeing Duwamish Sediment Other Area (DSOA) Early Action Area Removal Action and is “double washed” by the material supplier to further remove excessive fines that create turbidity upon placement. As was identified during Boeing’s placement of this material and on many other cleanup projects in the region, an

observable brown colored "plume" developed on the surface of the waterway during placement. This discoloration extended to the 150-foot point of compliance but the turbidity measurements at that location did not identify turbidity exceedances. The PPM operator revised their placement procedures and production rates to minimize to the extent possible the visible extents of the discoloration. These same placement procedures were used during subsequent backfill placement operations and a discolored surface plume of similar spatial extents was observed.

Anchor QEA discussed with EPA the presence of the above described discoloration extending beyond the point of compliance with no associated turbidity exceedances. EPA stated that no additional turbidity monitoring (associated with observed discoloration) would be required during future placement activities if PPM limit their placement cycle time (number of seconds between each bucket of placed clean material) to the cycle time that was used during no measured turbidity exceedances. Anchor QEA coordinated with PPM and reviewed the material placement volumes and duration to determine the average cycle time on August 10. The average cycle time was approximately 1 bucket placed every 40 seconds. Based on EPA's request, PPM will limit their backfill placement cycle times to be no faster than this rate during all day and night operations. Anchor QEA will perform day and night time construction oversight during backfill placement and document that PPM is not exceeding this cycle time limitation.

## Approved By *(Not valid until signed by EPA)*

| | | |
|---|---|---|
| **Approval Recommended – Anchor QEA CM** | | |
| Ryan Barth, PE, Project Engineer |  | 8/21/2014 |
| *(Print name)* | *Signature* | *Date* |
| Mike Roberts, PE, CCM |  | 8/21/2014 |
| *(Print name)* | *Signature* | *Date* |
| **Approved by Owner** | | |
| Amy Essig Desai, Owners Representative |  | 8/21/2014 |
| *(Print name & title)* | *Signature* | *Date* |
| **EPA** | | |
| Rebecca Chu, Unit Manager | | |
| *(Print name & title)* | *Signature* | *Date* |

**Attachments:** None

**Copies:** Contractor *(PDF)*
Owner *(PDF)*
File

# REMOVAL ACTION WORK PLAN (RAWP) MODIFICATION REQUEST (RFM)

## RFM-009

| | | | |
|---|---|---|---|
| RAWP Section: | **Section 4.2 and Appendix H of the Removal Action Work Plan** | RAWP Subsection: | All applicable subsections |
| Project Name: | Jorgensen Forge Early Action Area Removal Action | Project No: | 080224-01.02 |
| Contractor: | Pacific Pile & Marine, LC | Date: | September 5, 2014 |

## Summary of Proposed Revisions and Rational to EPA-approved RAWP

Section 4.2 and Appendix H of the EPA-approved Removal Action Work Plan (RAWP) identifies the in-water construction activities will be completed by Pacific Pile & Marine (PPM) by September 6 to eliminate impacts to tribal fishing. EMJ has been firmly committed to completing the in-water work construction by that date. The Contract Documents with PPM required the in-water construction to be completed by that date and PPMs schedule was developed and managed to achieve that deadline. As discussed with the U.S. Environmental Protection Agency (EPA) in mid-August 2014, the Tribe notified us that their tribal fishing would not initiate until September 14. This allowed another week to complete the in-water construction. Regardless, Earle M. Jorgensen Company (EMJ) has been continuing to push PPM to attempt to complete the work by September 6 to maintain a schedule buffer to account for potential unknown delays.

As discussed with EPA during the weekly construction meetings on August 27 and September 3, 2014, due to some unanticipated delays coupled with tidal limitations for placement of clean shoreline containment from the waterside, PPM is now scheduled to complete in-water construction by September 11. Dredging has already been completed so all work from September 6 through 11 is associated with the last remaining placement of subtidal backfill and limited armor material along the toe of the shoreline bank. PPM is confident they will complete the in-water placement of these clean materials by September 13.

## Approved By *(Not valid until signed by EPA)*

**Approval Recommended – Anchor QEA CM**

| | | |
|---|---|---|
| Ryan Barth, PE, Project Engineer | Ryan Barth | 9/5/2014 |
| *(Print name)* | *Signature* | *Date* |
| Mike Roberts, PE, CCM | | 9/5/2014 |
| *(Print name)* | *Signature* | *Date* |

**Approved by Owner**

| | | |
|---|---|---|
| Amy Essig Desai, Owners Representative | Amy Essig Desai | 9/5/2014 |
| *(Print name & title)* | *Signature* | *Date* |

**EPA**

| | | |
|---|---|---|
| Rebecca Chu, Unit Manager | | |
| *(Print name & title)* | *Signature* | *Date* |

**Attachments:** None

**Copies:** Contractor *(PDF)*
Owner *(PDF)*
File